etc.

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PEOPLE IN QUANDARIES:

And Why They Are There

WENDELL JOHNSON[1]

I HAVE spent much of the past ten years in other people's quandaries, being company to misery, holding the damp, trembling hand of frustration. It has seemed necessary to conclude that these quandaries, these personal maladjustments, are not strictly private affairs. They appear to involve not only individual frailties and confusions, but also, and more impressively, they signify a set of conditions peculiar to our general culture. Such maladjustments intimate, as it were, that civilization is more or less allergic to itself.

Beneath their fascinating individualities, one may discern a provocative similarity among unhappy and inefficient people. The mosaic of misery is not altogether haphazard. In the contemplation of this fact one acquires a sense of the pervasive social forces influencing human behavior. George D. Stoddard has said that one can only be what one could have become—and it is to be soberly considered that what one could have become is determined, not alone by the physical structure with which one is born, but also, and profoundly, by the structure of the society into which one is born. As a matter of fact, one can scarcely understand individual personalities except as one understands the social framework within which and by which their main characteristics are determined. Since this is so, it also follows that the individual reflects that social framework, and thus an analysis of individual personalities, particularly the extreme types that we call maladjusted, enables us to gain a peculiarly keen insight into those social and cultural forces that shape the lives of all of us as individuals.

I

It is neither an index to 'human nature' nor an accident of 'chance' that most, if not all, so-called maladjusted persons in our society may be viewed as frustrated and distraught idealists. Distraught because they are frustrated, and frustrated because they are 'idealists,' they are living testimony of the price we pay for the traditions we cherish, and for the aspirations which those traditions encourage together with the restrictions which they tend to enforce. It is not that this 'idealism' is always immediately apparent —on the contrary, it is rather likely, as a rule, to elude the superficial observer. It is our unstudied tendency, indeed, to assume that what maladjusted persons need most is something that we call a sense of direction, of purpose, of 'noble' aspiration. In this we are not altogether mistaken—but a partial understanding serves usually as an effective barrier to more penetrating wisdom.

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The ideals of the malajusted are high in three chief respects. Most fundamentally, they are high in the sense that they are vague. Being vague, they are difficult to recognize; being difficult to recognize, they appear to be elusive. It is the consequent misfortune of the individual whose ideals are vaguely defined that he has no sure way of determining whether or not he has attained them. He maintains, therefore, the disquieting belief that he has failed, and he becomes increasingly convinced that his ideals are difficult to reach. Ideals that are difficult to achieve, though it may be primarily because one remains uncertain of whether or not one has achieved them, have the psycho-logical or semantic value of high ideals.

As we contrive to go from A to B, from what we may refer to generally as 'failure' to something else which we may value as 'success,' the crucial point in our journey is that one which we agree to recognize as the point of transition—the point at which we leave A to enter B. Unless such a point *can* be recognized, we are denied the experience of believing that we have reached our destination, that we have achieved 'success.' And until we *can* believe that we have achieved 'success,' we continue to assume that we have not achieved it—we continue to experience 'failure.' Under such circumstances we feel frustrated and, eventually, distraught.

When B is vaguely defined, A is correspondingly obscure — when 'success' cannot with certainty be claimed, 'failure' cannot with confidence be disavowed. There can be no transition point on the road from A to B; no matter what may be the appearance of the country through which the road passes, there is nothing about it to indicate that it lies within the cherished land of B. A gentleman of the writer's acquaintance, whose ideal is 'wealth,' has acquired two million dollars—and stomach ulcers. A lady whom the writer has known for many years has pursued the will-o'-the-wisp of 'charm' with such unrelenting intensity that she has achieved almost innumerable symbols of decorum, and memories of Cairo, Vienna, London and Vera Cruz—and headaches of medically obscure origin. To such persons in pursuit of 'success,' their definite accomplishments are like a display of etchings which they readily concede to be beautiful, but cannot ever thoroughly enjoy because they are haunted by the question, 'But are they Art?'

In a word, these individuals recognize their specific achievements, are sometimes temporarily buoyed up by them, and may even recount them with an air of unmitigated boasting. But they do not find them satisfying. As a matter of fact, they frequently *appear* to state their goals in quite definite terms, but the uneasy fervor with which they continue to grope beyond these goals as they annex them, one by one, suggests something of the Hitlerian delirium, so well distilled in that ironical refrain, 'I have no more territorial claims in Europe!' Unable to recognize any one of these specific goals achieved, any one definite accomplishment, as the point of transition from A to B, from 'failure' to 'success,' the individual comes at last to the unhappy and exasperating state in which he evaluates each new achievement as further evidence of 'failure.' In spite of all the prizes he captures, 'success' eludes him!

It eludes him for the remarkably obvious, but persistently unnoticed, reason that 'success' is merely a verbal mirage. What he seeks to escape is an *absolute* 'failure,' what he anxiously pursues is an *absolute* 'success'—and they do not exist

outside his aching head. What he does in fact achieve is a series of *relative* successes; and these are all that he, these are all that anyone, can ever achieve. But in the midst of *relative* abundance, *absolutistic* idealists suffer the agonies of famine. They suffer because they do not know, because it has never occurred to them, because in our culture they are not clearly informed that 'success' is a word that may signify many, many things but no *one* thing. It is the *one* thing that they seek; it is the *one* thing that eludes them. Not gaining the *one* thing, 'success,' they are not comforted, they are rather dismayed, by the many things—they are dismayed by their very successes.

II

Another respect in which the ideals of the maladjusted are high is that they are highly valued. The intensity with which they are wished for generates the despair with which they are foregone. And the intensity with which they are wished for is generated by the dread with which the foregoing of them is contemplated. If not to succeed absolutely is to fail utterly, then to succeed absolutely becomes all-important. 'Success' becames indispensable, as 'failure' becomes catastrophic.

'Success' becomes indispensable when it appears to be the only alternative to 'failure'—and *absolute* 'success' is, by definition, by virtue of a semantic trick, the only alternative to *absolute* 'failure.' In order to give to these remarks a more lively significance, it is necessary to place them in a proper context, by indicating the basic pattern to which they refer. If we are to appreciate the human importance of this basic pattern, we must go for a moment to the man who, for the most part, established it as *the* pattern upon which our traditional culture has been based. That man lived 2300 years ago in Greece. His name was Aristotle. So influential were his works that our civilization has come to be referred to as aristotelian. There is not one among us who has not been deeply affected by his teachings. What each one of us could have become has been determined in no small measure by the fact that Aristotle lived and wrote twenty-three centuries ago. Many of us may not be particularly conscious of all this; undoubtedly many of us have scarcely heard of Aristotle and 'know' little or nothing about him. Nevertheless, insofar as we are not scientific, we are all essentially aristotelian in our outlook, in our fundamental attitude, or set, or orientation to life. This is to say simply that, as individuals, we share the orientation that has been for so long a time basically characteristic of our culture; each new generation absorbs it from the last, and quite unconsciously transmits it to the next.

We need not be 'academic' or complicated in what we must say briefly about Aristotle. What he did was to observe the behavior, and especially the language of the people of his day and of his world. He was a remarkably astute observer. Then he formulated in words, words that have proved to be all but indelible, the 'as-if-ness,' so to speak, of the behavior and the language of his people. What he said and what he wrote, in effect, was this: 'They act as if, they talk as if, all that they feel and believe and live by might be reduced to three fundamental premises or rules. First, they seem always to talk and to act as if a thing is what it is. It is possible to put it in this general form: A is A. That is to say, man is man, truth is truth, etc. This we may call the premise or the *law of identity*.

'In the second place, they speak and they behave as if they assumed that any-

thing must either be a particular thing or it must not be that particular thing. We may give this notion the general form: Anything is either A or non-A. That is, anything is either a man or it is not a man, anything is either true or it is not true. We may call this the premise or *law of the excluded middle*. It represents the fact, as I observe it, that men are oriented in an either-or-ish, or two-valued way.

'Thirdly, they talk and they conduct themselves generally as if they took it for granted that something cannot both be a particular thing and also not be that particular thing. This we may state in the general form: something cannot be both A and non-A. That is, something cannot be both a man and not a man, something cannot be true and not true, etc. We may refer to this as the premise or *law of non-contradiction*.

'These, then, the laws of identity, of the excluded middle, and of non-contradiction—these appear to be the basic laws of thought for these people. It will be noticed that each implies the others: if A is A, then everything must be either A or non-A, and, of course, nothing can be both A and non-A. It may be said that the law of identity is basic to the other two; but, at least, if it is accepted, and it appears to be, the other two laws are necessary also, are required by the law of identity. These three laws, then, taken together, constitute the basic mould in which men shape their feelings, and their thoughts and all their living reactions.'

In large measure they still do. These laws are, in the final analysis, what we speak of when we speak of *common* sense. That is to say, they are, and they have long been, commonly accepted. Most of us, however, are as unconscious of Aristotle's laws, as such, as he formulated them and as they have been expounded by teachers of logic ever since, as were the ancient men whose actual conduct and language the laws were intended to describe. But once stated, they sound as 'right' to us as doubtless they did to the ancient Greeks. What Aristotle did was to give men words with which to make acquaintance with themselves. What he did, that is, was to make men more precisely conscious of themselves, conscious of the rules of their own behavior. Being more conscious of the basic pattern of their conduct, they could behave more deliberately, more consistently in accordance with the basic pattern. They could *plan* what they might say and do, for they had been given a 'blueprint,' a 'map,' of language and of 'thought' and of action. And the plans which they proceeded to work out, on the basis of Aristotle's laws, gradually became civilization as we know it—in the sense that civilization may be regarded as institutionalized 'logical' forms and verbal structures, involving relatively standardized ways of making distinctions and generalizations, and of reacting in terms of them.

The value of Aristotle's generalizations is to be measured, therefore, in terms of the benefits which our civilization has yielded, just as the viciousness of his generalizations is to be gauged by reference to the misery which that civilization has entailed. Latest reports from our own country, the United States, indicate that the number of persons admitted each year to hospitals for the 'insane' tends to equal the number entering colleges and universities. (In fact, some of them go from the universities to the hospitals!)

Against this background, we shall resume presently our discussion of the 'idealism' of maladjusted people. Before we do that, however, it is appropriate that we take due pains not to leave the

impression that Aristotle is to be regarded as having been a malicious or stupid person. Beyond question, he was neither. His contribution to human progress was stupendous. The difference between an aristotelian and a pre-aristotelian, primitive society is vast, indeed. As a matter of fact, insofar as the consequences of Aristotle's generalizations have been unfortunate, they have been due chiefly to the shortcomings, not of Aristotle himself, but of his followers. After all, when Aristotle formulated his laws he made it possible for men to become not only more highly conscious, but also more effectively critical, of the basic pattern of their behavior and their language. But men made the tragic error of mistaking the laws of Aristotle for laws of *nature,* to be universally employed *and never revised.* They accepted them as 'Truth' in an absolute sense. Consequently, if they were 'Truth,' modifications or contraries of them were 'non-Truth.' Thus, they were perpetuated, and they were used wittingly and unwittingly to build a system of doctrine and an elaborate social structure. This system and this social structure we shall call aristotelian—without implying, however, that criticisms of them and suggestions for their revision are to be construed necessarily as criticisms of Aristotle. Indeed, the genius of Aristotle was such that one may well assume that he himself would have succeeded in improving upon his original notions. If he were living today he would surely be numbered among the great non-aristotelians.

Against the backdrop of this brief sketch of the aristotelian system, we are able to gain a more revealing view of what Karen Horney has called 'the neurotic personality of our time.' Maladjusted individuals appear to take an 'A is A' attitude toward 'success,' or 'wealth,' or 'happiness,' or whatever other ideal they pursue. Automatically, therefore, they operate in terms of a two-valued (excluded middle) orientation in terms of which anything must be either 'success' *or* 'failure,' 'wealth' *or* 'poverty,' 'happiness' *or* 'misery.' And the pattern is rounded out with their further assumption that nothing can be both 'success' *and* 'failure,' nothing can be both 'wealth' *and* 'poverty,' etc. (non-contradiction). Locked within this two-valued structure of orientation, they weave about themselves a web of wonderful confusion.

Just as the premise that 'truth' is 'truth' leads eventually to Pilate's jest, and thence to cynicism, since no man can answer for all men, nor for himself in absolute terms, 'What *is* truth?'—so the premise that 'success' is 'success' leads ever nowhere but to worry and frustration. Moreover, the assumption that there is something that is 'success' requires the further assumption that all other things are 'failure,' and so the bedeviled individual reduces himself to only two alternatives, the one to be cherished as the other is to be abhorred. In this sense, and by these means, he comes to place a very high value upon his ideal. And when one strives long enough for a highly valued ideal that appears also to be persistently unattainable, one feels not only thwarted but also, at last, demoralized.

III

It has already been said that in some instances maladjusted persons appear to set for themselves goals that are not vague, but that are quite specifically defined—although such goals turn out usually to be transitory. It is by means of a consideration of these specific goals that we discover the third respect in

which the ideals of the maladjusted are high. They are high in the sense that the odds against their being achieved are very great.

It has been reported, for example, that approximately two out of every three students enrolled in a large midwestern university expressed themselves as wanting to become doctors, lawyers, university professors, or to achieve some other comparable status. The crucial fact is that only about one out of sixteen university students *can* achieve such an ideal in our society. People who turn away from listening to *Information Please* with a reinforced conviction of their own stupidity; young girls striving to look like Myrna Loy or Betty Grable; people driving bigger cars than they can pay for; young brides frantically wondering whether to give up their husbands or their Hollywood-engendered definition ('ideal') of 'husband'—all these, and the millions they resemble, live the 'high idealism' conducive to what Dr. P. S. Graven has called 'unsanity.'

This tendency of maladjusted persons to set unrealistically high standards for themselves appears as a necessary consequence of their aristotelian orientation. Since their notions of 'success' and 'failure' are ultimately of an absolute character, and are consequently vague and two-valued, they tend to assume that they have 'failed' until they have *unquestionably* 'succeeded.' As a result, they feel driven to 'aim high,' to be 'tops,' to break records, to do something 'bigger and better.' In this they are continually encouraged by many of the more obvious features of their semantic environment. It is this urge to 'aim high,' to out-snob the snobs, that is appealed to—and stimulated by—advertisers generally, and by Hollywood producers, popular magazine writers, etc. All of which means that this reaching for the moon is not a unique characteristic of the maladjusted individual; it represents, rather, a characteristic of our society, and the maladjusted person simply reflects it. And it is one of the influences of his semantic environment that contributes definitely to his difficulties.

Quandaries, then, are rather like verbal cocoons, in which individuals elaborately encase themselves, and from which, under circumstances common in our time, they do not tend to hatch. The peculiar structure of these cocoons appears to be determined in great measure by the structure of the society in which they are formed—and the structure of this society has been and continues to be determined significantly by the structure of the language which we so unconsciously acquire and so unreflectively employ. Simply by using that language and by living in terms of the basic aristotelian orientation which it represents and fosters, we tend to cultivate this 'idealism' and so to suffer the frustration and demoralization which are so conspicuous in the lives of people in quandaries.

Because such people are 'idealists,' they subject themselves more or less continually to the experience of 'failure,' and from this fact they acquire another of their outstanding features: a tendency to develop what we have learned to call inferiority feelings or inferiority complexes. There is an old saying that nothing fails like failure. Nothing does, indeed. The tears which it produces water the soil from which it grows ever more luxuriantly.

Various investigations made by psychologists have served to demonstrate beyond reasonable dispute that feelings of inferiority are the rule rather than the exception. As a matter of fact, so common is the tendency of individuals to

regard themselves as 'under par' that the renowned Viennese psychologist, the late Dr. Alfred Adler, constructed an elaborate theory of human behavior, and sought to explain the greater share of our personal adjustment difficulties, on the basis of such negative self-evaluation. He made the term 'inferiority complex' a part of our common vocabulary; the fact that it has been so generally adopted indicates that it does express a feeling with which most people are familiar.

In definitely maladjusted persons this common mode of self-evaluation is merely exaggerated. In this, as in practically all other respects, people whom we call maladjusted, or neurotic, or abnormal, are not unique. They are not a different *kind* of people; they simply present more extreme forms of what is, after all, quite ordinary behavior. 'Everyone is crazy except thee and me'—and we wouldn't know about ourselves, of course. In a sense, there are no 'crazy' people—there are only 'crazy' ways of behaving. And we all behave in those ways more or less.

The sense of failure or of inferiority is more readily observed in maladjusted individuals, because in them it is more elaborately developed than it is in ordinary folk. When clearly observed, it is seen to be quite vague or generalized, very persistent, and bound up with anxiety or fear, discouragement, and other 'emotional' reactions. Unless persons with inferiority complexes have progressed to the grave stage of sheer despondency and stuporous lassitude, they tend to be on the defensive, to exhibit a high degree of 'insultability,' to resent criticism, and to be generally 'touchy.' They appear to be, and if you examine them you find that they are, quite tense. Frequently they react to something they see, and especially to something they read or that is said to them, in a sudden, undelayed manner, and in an exaggerated way. *They tend, that is, to react too quickly and too much.* In conversing with them one senses that they might be easily offended or 'hurt,' and so it is somewhat difficult to feel at ease in their company. They do not make good companions—least of all for themselves.

IV

Now, what these people have not learned is the simple fact that there is no failure in nature. Failure is a matter of evaluation. Failure is the felt difference between what you expect and what you get. It is the difference between what you assume you have to do, what you demand of yourself, and what you actually do. It is what you feel when your expectations exceed your realizations. If your ideals or goals are too high, in the sense that they are too vague, or too highly valued, or unrealistic, then you are likely to experience a sense of failure. Eventually you are likely to suffer from an 'inferiority complex,' a low opinion of yourself. You are likely to be more or less overwhelmed by what you will call 'the general impenetrability of things.'

To this unhappy development, however, you do not remain indifferent. At least until you become quite thoroughly demoralized, you fight back. You feel anger, more or less, toward the persons and even toward the social rules and material circumstances which, as you suppose, are responsible for thwarting you. This tends to become very complicated; you even develop food dislikes, aversions to colors, to names, to places, or to other things associated somehow with your frustrations. You tend to behave accordingly. If aggressiveness is permitted—and in some forms and under certain con-

ditions it is definitely encouraged in our culture—you are likely to attack openly or indirectly the persons who seem to be blocking your progress. You will try to weaken their influence by talking about them, by opposing them in elections, by trying to block their plans and in various other ways. By any means permitted, you will carry out your own variety of 'bloodless purge.' Of course, some individuals resort to outright murder, but they are in the minority. The important point is that you end up devoting more and more of your available energy to these side-tracking activities of hatred and aggression. You have less and less energy, therefore, to expend in efficient and productive work. Besides, you increase the number and the vigor of your enemies. 'Success' therefore, recedes farther and farther from your grasp. You cannot forever escape the growing realization that you are waging a losing fight, and a kind of desperate weariness creeps over you as the clouds of failure more deeply darken your horizons.

The sense of failure, thus generated and nurtured, tends sooner or later to blend into a state of boredom, a generalized loss of interest in possible opportunities for achievement. Finally, you find yourself in a state of depression. This happens because in our society you are not permitted, as a rule, to be simply bored. The influences of your semantic environment, acting through the urgings, pleadings, scoldings, threats, encouragements, and taunts of your family, friends and associates, and the incessant stimulation from press, radio, movies, and what-not—these influences keep prodding you. They will not let you rest. They will not allow you the easy solution of sheer boredom. Because of this persistent goading you may continue to sally forth from time to time to storm the bastions of 'success,' but absolute 'success' continues, as always, to elude you. As your sense of failure deepens, you settle more and more into despondency. You are then not only bored, but you are also sorry about it. You are forced to evaluate your 'failure' —to feel inferior because you feel inferior.

In all this is to be seen the basic design of our common maladjustment. We may call it the *IFD* disease: from 'idealism' to frustration to demoralization. Probably no one of us entirely escapes it. It is of epidemic proportions. Certainly anyone occupied professionally with personal problems of men and women—and of children—comes to recognize it as a sort of standard base upon which are erected all manner of specific difficulties and semantic ailments. In 'the troubles I've seen' it has predominated conspicuously. In my experience, no other ailment is so common among university students, for example, as what I have termed the *IFD* disease. It is, moreover, a condition out of which there tend to develop the various types of severe 'mental' and nervous disorders, the neuroses and psychoses that fill our 'mental' hospitals with such a lush growth of delusion and incompetence.

V

There remains to be considered one other symptom of what we regard as personality maladjustment. It is so obvious that it is generally overlooked, although it has been stated in various ways by various writers. A practicing psychiatrist, Dr. Coyne Campbell, however, speaking in 1941 before the Central States Speech Association meeting in Oklahoma City, expressed it so pointedly and so simply that it will serve our purpose well to recall his main statements. What Dr. Campbell said in effect was that the pa-

tients who were brought to him, because they had been judged to be seriously maladjusted or even 'insane,' showed one chief symptom: *They were unable to tell him clearly what was the matter.* They simply could not put into words the difficulties with which they were beset. Surely no one who has made it his business to help people in trouble has failed to observe their relative inarticulateness. In the course of some conferences with a lady in distress, who laid claim to a pronounced feeling of personal worthlessness, I one day placed a mirror in front of her and asked her what she saw in it. For a full minute by the clock she stared at the mirror and said nothing at all. Then she said weakly, 'I can't say anything.'

Such a reaction is not to be taken for granted. It is something that must be understood. So, also, is the sort of reaction one frequently encounters in persons who talk at a great rate, with an impressive verbal output, but who never get outside their elaborate verbal circles. They are full of theories spun from almost pure sound. One suspects that their seeming compulsion to talk on and on is due mainly to the fact that they themselves realize vaguely that, after each outburst, they have not yet said anything, and so they try again to put into words the feelings from which they suffer. Essentially they are no more articulate than are the individuals who scarcely speak at all.

Dr. Coyne Campbell remarked further that when he had succeeded in training a patient to verbalize his difficulties clearly and to the point, it was usually possible to release him. The patient was usually able then to take care of himself. This will seem strange to anyone who has not thoroughly considered the role of language in personality adjustment. The wild and irrelevant and vague remarks of people in quandaries have been regarded generally as nothing more than the foam on the beer, so to speak. That they might be an integral part of the beer, *that the language of distress might be part and parcel of the distress,* this does not seem to be a commonly held notion. It has not even been emphasized clearly and definitely by the psychoanalysts, who have demonstrated so elaborately the curative value of talk and more talk. The tremendous amount of talking done by the patient on the psychoanalyst's couch is hardly to be regarded as unrelated to such changes in the patient's behavior as may come about during the long course of treatment.

Back of Dr. Coyne Campbell's statements lies the plain fact that before a problem can be attacked effectively it must be stated with reasonable clarity. And as soon as it has been so stated, some kind of solution to it becomes more or less apparent. In other words, people who are confused and maladjusted are likely to remain so until they learn to state their problems clearly enough to indicate what sort of steps might be taken in order to change their situations or their behavior to advantage. Certainly any scientific worker of experience knows that by far the most important step toward the solution of a laboratory problem lies in stating the problem in such a way as to suggest a fruitful attack on it. Once that is accomplished, any ordinary assistant can usually turn the cranks and read the dials. Competent research directors understand the uses and limitations of their apparatus, certainly, but their major contribution comes, not in the answers they wring from nature with their own hands, but in the incisive and crucial clarity of the questions they put to nature. Technicians can man the scientist's machines and obtain answers to his well-

stated questions; what distinguishes the scientist is his ability to state problems, to frame questions, so that the technicians can make the machines yield facts that are significant.

Now, intimately personal problems are not greatly different in this respect from the problems of the laboratory. Before they can be solved they must be stated. Before helpful answers can be got, suitable questions must be asked. We all want answers. They can be very relaxing. What the maladjusted person cannot do —and what he must learn to do—is to specify the sort of answers he needs. This is a way of saying that he has a conspicuous lack of ability to ask questions in such a way as to obtain answers that would be relaxing, or satisfying, or adequate. As soon as he develops such ability, he can, as Dr. Campbell has implied, take care of himself for all practical purposes.

There cannot be a precise answer to a vague question. The terminology of the question determines the terminology of the answer. Scarcely any other principle is more important in relation to a consideration of the befuddlement and conflict that make for personal inefficiency and unhappiness. The particular questions we ask ourselves determine the kinds of answers we get, and the answers we get make our lives in a large measure the sort of lives they are. Unschooled in the techniques of inquiry, we tend to flounder in a fog of obfuscation and error, individually and socially. If all that we have ever tried to mean by 'mental hygiene' might be reduced to one word, that word would be *accuracy*—in the sense of adequate map-territory relationships. And the techniques of accuracy are, in the main, techniques of language. The verbal confusions of maladjusted people are not independent of the confusions in other aspects of their behavior. The relation is close; the one cannot be understood in isolation from the other.

VI

In this view of maladjusted persons as frustrated and distraught idealists, we may glimpse the broad outlines of problems that are common to us all in varying degrees. The *IFD* disease, as we have sketched it, is not so much an affliction of individuals as it is a reflection of strong semantic forces that play upon and through individuals. So long as these forces are prevalent, each one of us is in some measure susceptible to the misfortunes they engender. There is a contagion about semantic maladies. We are continually exposed to them, and we tend to 'catch' them.

This raises the question as to how they are transmitted. What sort of 'bacilli' infect our lives with confusion and frustration and despair? A clue to an answer is to be found in the relative inability of maladjusted people to verbalize their difficulties, to state their problems, to ask their questions clearly and in such a way that they might be answered readily and effectively. This clue points somehow to language. It indicates that in the structure of our common language there are disintegrative factors, which affect adversely in varying degrees the living reactions of those who use the language. To a significant degree the structure of our common language can be described in terms of the aristotelian 'laws' previously discussed. The problem has been treated elaborately by Alfred Korzybski in *Science and Sanity* and it has been concisely considered by Hayakawa in *Language in Action.*

A systematic consideration of these matters points to the double significance

of our language structure. On the one hand, it plays a role in determining the structure of our culture, our society, our civilization. On the other hand, it serves as the chief medium or means whereby the individual acquires or *interiorizes* that culture structure. Thus, a study of language structure leads both to a deeper understanding of our civilization and its problems and to a keener insight into the basic designs of individual lives and personalities. It is as though mankind had spun an enormous web of words—and caught itself. Our problem is in large degree one of unraveling this net of symbolism in which our human destiny has become entangled.

It is to this problem and its many ramifications that general semantics is addressed. General semantics, however, is not to be adequately grasped nor effectively applied except as it is viewed in a proper setting and in relation to the individual and social problems upon which it bears. Alfred Korzybski has put the matter in these words, 'General semantics is not any "philosophy," or "psychology," or "logic," in the ordinary sense . . . In brief, it is the formulation of a new non-aristotelian system of orientation which affects every branch of science and life.'[1] Among the problems in relation to which its foundations and significance can be well appreciated are those of personal maladjustment which we have discussed in the preceding pages. The idealism that leads to frustration and the demoralization that rounds out the unhappy sequence become something more than merely unfortunate and mysterious when viewed in relation to the neuro-linguistic rigidity and confusions which general semantics is designed to illuminate and counteract.

It is in relation to this fact, with its pervasive and intimately personal implications, that one may recognize the reasons for both the appeal and the significance of general semantics. There is something about the 'time of the world' in which we find ourselves that is conducive to restiveness and self-searching, though not necessarily—not at all necessarily—to weariness or cynicism. Whatever else we may say of our time, we must, if we do not deceive ourselves, recognize that this is an age of intensive and candid questioning. As we come to appreciate the degree to which an older generation did not know the answers, we come to understand more and more clearly the importance of knowing the questions—the importance of designing techniques of inquiry by means of which a greater wisdom might be distilled from experience. It is in its deliberate and systematic concern with the techniques of inquiry that one may most readily find the distinguishing features of general semantics and the degree of promise which it holds for the emancipation of the future from the misfortunes of the past, in our lives individually no less than in that cooperative adventure that men call civilization.

[1] *Science and Sanity*, p. vi.

A civilization which cannot burst through its current abstractions is doomed to sterility after a very limited period of progress.

. . . almost any idea which jogs you out of your current abstractions may be better than nothing.

A. N. WHITEHEAD, *Science and the Modern World.*

ONE GOLDEN AGE:

Mathematics Since 1801[1]

ERIC T. BELL

[FOREWORD BY A. KORZYBSKI: Eric T. Bell, a Scotsman educated in the United States, Professor of Mathematics at the California Institute of Technology since 1927, is one of the most outstanding mathematicians in the theory of numbers, numerical functions, analytical theorems in arithmetics, multiple periodic functions, etc. Professor Bell is one of the very few mathematicians who outside of their specialty really know mathematics-as-a-whole with a keen outlook for physics.

He was one of the first understanding interpreters of Einstein's theory in physics. In 1921 appeared his 'Principle of General Relativity: How Einstein, to a Degree Never Before Equalled, Isolates the External Reality from the Observer's Contribution,' one of the outstanding essays submitted to the Einstein Prize Essay Contest for the Eugene Higgins prize. Professor Bell, a former student of Cassius J. Keyser of Columbia University, is also unique among technical mathematicians in his intimate knowledge of the history of mathematics and the work in the foundations of mathematics. He is a Bocher prize winner, a member of the National Academy of Sciences, past president of the Mathematical Association of America, etc., and a member of many American and foreign mathematical associations.

In addition to his unusually extensive and creative technical work and many scientific articles, he has written a number of non-technical books about mathematics, such as *Debunking Science, The Queen of the Sciences, Numerology, The Handmaiden of the Sciences, The Search for Truth, Men of Mathematics, Man and his Lifebelts,* and *The Development of Mathematics*—works that every mathematician as well as layman should read to know something of what mathematics is about. The style of his writings is unique in scientific literature; always just to the point, with a keen sense of humor, he says in a few crisp words what others might need pages to convey. As a recreation from his more serious work, he also writes scientific fiction under the name of John Taine.

As a melancholy reflection, I believe that one may become tired of technicians' ignorance of mathematics as a language of special non-aristotelian structure, with fundamental mathematical works being read by 'only one professional mathematician in thousands today,' and some other 'learned' specialists talking about mathematics without knowing what they are talking about.

For students of general semantics this article is of special importance because of the historical contrast between Greek

[1] Reprinted, with the kind permission of the author and the editors, from *The University Review* (Kansas City) IX, 82-86 (Winter, 1942).

static mathematics and modern dynamic mathematics. Professor Bell says, 'If Greek mathematics needs an epitaph, the following might not be too inappropriate: Here lies the body of a sterile perfection, the victim of its devotion to barren purity.' As students of general semantics, we can enlarge that bit of wisdom to apply to the Greek aristotelian orientations, which different 'philosophers' and philosophizing laymen profess in their endless rationalizations and verbalizations: 'If the Greek aristotelian system needs an epitaph, the following might not be too inappropriate: Here lies the decomposing body of a sterile perfection, the victim of its devotion to barren purity.' Is it not time to inter this corpse and start a dynamic re-orientation which would fit mathematics, science, *and life?*]

THE year 1942 seems scarcely an appropriate time to mention a golden age in anything. Civilization admittedly is in a bad way, and the pessimism induced by this obvious fact seems to have carried over to the arts and literature. All the great pictures were painted centuries ago; no deathless novel has joined the classics on the top shelf in sixty years; current poetry and music are worthless; philosophy has been duller than mutton for God knows how long; religion is not what it was in the days of Chatauqua; science has gone insane, and most of us with it; western civilization is senile and presently will be dead and dammed. It is all very depressing—if you are gullible enough to believe much of it.

But granting that there may be something in the Egyptologist Petrie's cyclic theory of cultural epochs, we may agree that certain forms of art reach a maximum of excellence, maintain their perfection for a brief season, and then decline in a sterile imitativeness of the highest, to fritter out in meaningless refinements and collapse at last in total imbecility. We have been assured, for example, that the Greeks did better in the plastic arts than any of their successors; that the Elizabethans made it superfluous for anyone after them to write a love lyric; and that the Victorians did things with horsehair and crimson plush that will never be surpassed.

Intone or snuffle the roll of great names, and enjoy a good wet cry for the plight of your own age: Homer, Sappho, Aeschylus; Socrates, Plato, Kant; Dante, Shakespeare, Goethe; Alfred Tennyson, William Morris, Martin Tupper — all these only from the immortals in literature or philosophy or interior decorating, and all as dead as Pompey. Take any list you like of the hundred best symphonies, or the thousand best pictures, or the ten thousand best books of all time—or at least of as much of all time as has yet elapsed—and you will feel like jumping off the roof. And for anything a mere spectator of literature and the arts can say, you may be doing the wisest thing, unless—

Unless what? Unless you happen to have noticed that not a single name in science has been called. True, Goethe rated himself a scientist of the first rank, and regarded all his contribution to literature as a trifle of little account. Confident that he would be remembered for his physics when his *Faust* had been forgotten, he slaved to set Isaac Newton right on optics. But beyond convincing the intelligentsia of his home town that Newton was a boor in ethics and a charlatan in science, the poet did not accomplish much of interest to scientists. The 'culture vultures' in Goethe's day were like that—as witless scientifically as snollygosters. Some of them may even have been unaware that they were living in a

notable age of poetry. Certainly none of them suspected that the golden age of the oldest of all the sciences had dawned in the year 1801. How could they, when their idol of the moment was living in the Stone Age so far as mathematics was concerned, and had never even heard the name of that unobtrusive fellow-countryman of his, who with Archimedes (287-212 B.C.) and Newton (1642-1727) is universally considered one of the three greatest mathematicians in history? Goethe's *Faust* (first part) appeared in 1808, the *Disquisitiones Arithmeticae* of Gauss (1777-1855) in 1801.

The master works of Archimedes are still as vital in mathematics and science as they were twenty centuries ago, though only a few highly specialized historians ever read a word that Archimedes wrote. *Faust* will almost certainly outlive Goethe's fatuities in optics, if it has not already done so. But to extrapolate from the past to the future, it seems unlikely that anything in *Faust* will have become an ingrained habit of thought for rational men two thousand years hence. Erudite scholars of that distant day will no doubt be able to make some sense of the quaint antics of Mephistopheles, and specialists in the science of the soul may at last have discovered what ailed Gretchen. But unless everybody then is two thousand years stupider than the majority of us are today, only inmates of hospitals for the mentally ill will be seriously affected by anything in *Faust*.

What of the *Disquisitiones?* Will anybody be reading it then? Probably not. Only one professional mathematician in thousands today has ever glanced at a line of it. Yet the thoughts of all have been influenced in some degree by what Gauss wrote in 1801, for it hinted at a liberation of the imagination in all mathematics. More than that, it was the masterpiece of this greatest mathematician since Newton, and it announced the sudden dawn of the golden age of mathematics.

Archimedes marked one great age in mathematics, and he still lives. Newton marked another, and the course of his life will be run only when our civilization ends. Gauss heralded the greatest of all, and as long as human beings retain their capacity for rational thought in science, or in mathematics, or in philosophy, the surge of discovery which he initiated will echo in their thoughts. All this, of course, is on the supposition that Gauss shares the historical fate of Archimedes. He may not. Our successors may find that superstition suits them better than science, and insist on going to perdition with Faust. Well, we can't stop them if that is what they are to want. May they have a better time at it than we are having in our strenuous attempt to anticipate them. Possibly they will; for like Goethe's hero they may welsh on their bet with the devil and be saved by their good works. In passing, it may be significant that the English Marlowe's Dr. Faustus paid his bet and was damned like a gentleman.

II

The golden age of mathematics that began with Gauss in 1801 continued to 1939, though naturally the effects of the first world war were plainly apparent by 1930. French mathematics, for example, was then at a lower ebb than at any previous time since the mid-eighteenth century. The old leaders were through, and the men of middle age who normally might have succeeded them either had been killed in 1914-1918 or had drifted away from mathematics. In Germany a similar but less marked decline was evi-

dent. The general level remained high. In the United States, Russia, and Japan there was an increase in mathematical productivity. Without undue chauvinism it may be said that American mathematics was not inferior in either quantity or quality during this period to the general output of Europe. The net outcome was a slight continued acceleration in the rate of progress. Then came the second world war, which may halt progress and end one of the world's great ages of intellectual achievement.

III

To dispose here of a preposterous fable that has recently gained currency through the highly ingenious but singularly misinformed speculations of an eminent sociologist, mathematics did not, as he asserts, reach its peak about the middle of the eighteenth century.[2] This item of misinformation is exhibited—wherever science is discussed—to prove that all our culture is decadent and our civilization so rotten that only the retarded chemistry of its corruption keeps it from falling apart. So far as mathematics is concerned, such a doleful conclusion could be reached only by an evangelical humanist bent on scaring the sin out of us by prematurely preaching the end of the world.

No mathematically literate man agrees with the learned sociologist's conclusion, for any such man knows that it does not rise to the lowest level of the ridiculous, but is merely idiotic. He knows also that the nineteenth century alone created approximately five times as much new mathematics as had been produced in the whole of preceding history. And he knows further that the first four decades of the twentieth century showed no overall diminution in the output.

How is it possible, it may be asked, for a conscientious and phenomenally industrious scholar to go so egregiously astray on a matter of verifiable fact? Suppose you wish to follow in this eminent man's footsteps; what must you do? It is quite simple! Base your conclusions on a scandalously naive though volumetrically imposing catalogue of all the advances of the past six thousand years in all the sciences, after making sure that the cataloguer has used only the broom-and-dustpan technique in collecting his items; employ no sweeper who has looked at any mathematics more recent than the early eighteenth century; and last, resolutely resist the temptation to learn any mathematics that was not already antiquated a hundred years before you were born. This procedure will infallibly lead you to the most remarkable conclusions—if that is your goal—all of which are at variance with ascertainable fact. But your labors will not pass unnoticed or unrewarded. You may even get a couple of honorary degrees for your outstanding services in the propagation of rubbish and for your call to repentance—'the end of the world is at hand.'

IV

A mere list of the achievements of mathematics since 1801 would recall the story to those already familiar with it, but might be so much hieroglyphics to others. All that can be attempted here is a description of the principal characteristic which distinguishes mathematics since 1801 from all, or nearly all, that preceded it. In a word it is *generality*.

Greek mathematics, it has often been observed, resembles Greek art. Each theorem is a distinct creation, perfect in

[2] EDITOR'S NOTE: The interested reader will recall that similar conclusions have been reached by the distinguished sociologist, Pitirim A. Sorokin, in his *Social and Cultural Dynamics* (4 vols., New York, 1937).

itself and distinguished from all others by its own completeness. Though proved by means of other theorems, each is its own end, and its simple beauty the justification of its existence. It is like a white temple on a bare hilltop, alone and an embodiment of perfection, suggesting nothing further to be done. It is eternally static and eternally lifeless.

Though it may seem paradoxical to lovers of Greek epic and tragedy, the Greek mind in mathematics was narrowly limited, with an ineradicable predilection for the finite and strictly bounded. Its primitive horror of the infinite—the unlimited, the endless, the unbounded—was permanently confirmed by an unfortunate experience in the fifth century B.C., when apparently sound logic applied to the analysis of motion produced certain paradoxes the Greek geometers were unable to resolve.

Any usable description of motion involves the concept of continuously varying *number*. For motion is based on a postulated *infinite divisibility of space* into *points*, and of *time* into *instants*. It was in this connection that the paradoxes arose. Terrified that all reasoning about the infinite might be infected with subtle paradox, the Greek mathematicians abandoned the attempt to create a dynamic theory of *number*, or a usable *mathematics of continuity*, and halted abruptly on the very threshold of modern mathematics. They thus missed discovering the simple general principles which would have given them any number of individual theorems they might desire by uniformly applicable processes. Discouraged, they returned to their familiar tools and continued to chisel out disconnected objects of art. Even Archimedes, who used anything that came to hand in making some of his most spectacular discoveries, recast his creations in the rigid classic mold before sharing them with his contemporaries.

If Greek mathematics needs an epitaph, the following might not be too inappropriate: Here lies the body of a sterile perfection, the victim of its devotion to barren purity.

V

In the next great age of mathematics, that inaugurated by Newton and Leibniz in the Seventeenth Century, mathematics escaped from the cramping bonds of the finite. The differential and integral calculus of these two men provided the long-sought solution of the problem of accurately describing motion, and made possible a rational analysis of all continuous change. Mathematics became dynamic.

The ceaseless flux of nature and the phenomena of growth and decay were now within the grasp of exact reasoning. The ancient horror of the infinite was dispelled forever in the brilliant achievements of the new mathematics in geometry, in astronomy, and in the physical sciences. An abrupt transition from the *exclusive special* to the *inclusive general* was already evident in the newer type of problem attacked in geometry. Instead of minutely anatomizing the geometry of this or that particular curve or surface, mathematicians began the classification of all imaginable curves and surfaces, and sought properties common to all the members of whole classes of geometrical objects. This, however, was only a shadow of what was to come in the nineteenth century.

Throughout the eighteenth century the ablest men devoted their strongest efforts to developing the Newtonian theory of gravitation and the application of the calculus to the physical sciences. Consequently the innate freedom of

mathematics itself was not envisaged. Preoccupied as they were with the innumerable uses of the new mathematics as an implement of discovery in the sciences, the leading mathematicians of the age paid scant attention to the marvelous instrument of power in their hands, and were content merely with the beautiful things it turned out in overwhelming profusion. Its own infinite potentialities of further development were not even suspected. But the decisive transformation had occurred, though unnoticed. Mathematics was as free as the human mind. Instead of the frigidly perfect Greek temple, mathematics was now a Gothic cathedral, with no suggestion of a cramped finality in any line or spire of it.

VI

At last, with the opening of the nineteenth century, attention turned to the development of mathematics on its own account. Realizing that the fatedness, the eternal necessity of any particular science of *space* or *number* is an illusion, Gauss as a boy of twelve had imagined the possibility of geometries other than the system of the Greeks. That ancient geometry had stood alone for over two thousand years. By the early 1830's Gauss and others had elaborated the first of the non-Euclidean geometries. Thirty years more, and the creation of new geometries for scientific or esthetic reasons had become almost a trade or a pastime.

It was the same in the higher arithmetic and in algebra, in the theory of functions and in the outgrowths of the calculus, in mathematical logic and in the study of abstract systems of relations between things of any kind whatever. Everywhere there was free inventiveness subject only to avoidance of self-contradiction. When any man of normal intelligence with some training and a little imagination could invent a new kind of algebra or a novel geometry, individual theorems as ends in themselves lost their attractiveness. General principles and powerful methods, each capable of producing an endless variety of theorems, were sought after, found, and exploited only long enough to certify their universality in their respective domains, or to satisfy their inventors' need for something less abstract than complete generality, when they were put aside for possible future use.

Simultaneously, numerous new subjects, whose aim and content would have been unimaginable to even the greatest mathematicians of the past, came into being, served the purposes for which they had been created, and passed into the rapidly increasing stock of positive knowledge. Though possible scientific use for these things was but seldom the occasion of their creation, they frequently justified their existence in the eyes of scientists and other practical men by proving to be the appropriate machinery for application to some new and rapidly developing science or technology. The mind had anticipated the hand.

And so it continued to the first day of the second world war.

> The explanatory crisis which now confronts us in relativity and quantum phenomena is but a repetition of what has occurred many times in the past. . . . Every kitten is confronted with such a crisis at the end of nine days.
>
> P. W. BRIDGMAN, *The Logic of Modern Physics*

MIND IS MINDING[1]

LESLIE A. WHITE

We should have a great many fewer disputes in the world if words were taken for what they are, signs of our ideas only, and not for things in themselves.—LOCKE, Essay on the Human Understanding.

'THE problem of the relation between body and mind has occupied philosophers and scientists since the dawn of thought, and to many it appears no nearer a solution now than then. It has been named the central problem of all philosophy, fundamental alike in the theory of knowledge, in ethics and in religion. Not less fundamental, however, is it for psychology and for physical science. . . .'

These are the opening words of the article 'Body and Mind' in *Encyclopedia of Religion and Ethics* by James Lewis McIntyre, Anderson lecturer in comparative psychology to the University of Aberdeen. Hundreds of books and thousands of lectures and articles have been devoted to the 'mind-body' problem. How is it possible for the body to have a mind? How can the mind have a body? Which is the reality, the body or the mind? How are body and mind articulated with each other? These are some of the questions which have plagued us for many a century. And 'to many they appear no nearer to solution now than then.'

Why has the 'solution' not been reached? Where is the difficulty?

It is the thesis of this essay that the 'solution' has not been reached because the problem is a false one, somewhat like the paradoxes of Zeno. The difficulty is one of verbal origin; it is of our own making. By rewording the problem the 'problem' disappears: use the word mind as a verb instead of a noun and no 'problem, fundamental either to the theory of knowledge, ethics, psychology, science' or to anything else, remains. Mind is minding; it is the behaving, reacting, of a living organism as a whole, as a unit.

Once upon a time, in a far-off land, a people was concerned with the problem of Golshok. No one knew *exactly* what Golshok was, but every one agreed that he (she or it) was very important and that their existence and welfare depended in large measure upon Golshok. Many of the best minds of this people devoted their lives to the study of Golshok. Their lucubrations were recorded and their pronouncements carried great weight. It was decreed that all social life was to be conducted in accordance with the principles of Golshok as set forth by the wise men. Of course it was necessary to put people to death occasionally because of their failure to comply with these principles. This was usually done by burning them alive. This went on for centuries. But not all people were content.

[1]EDITOR'S NOTE: This brief statement of the non-elementalistic point of view toward the problem of 'mind' is reprinted, with the kind permission of the author and the editors, from *The Scientific Monthly*, Vol. XLVIII (February, 1939), pp. 169-171. Leslie A. White is Professor of Anthropology at the University of Michigan.

Some were bent upon discovering just what Golshok really was—if anything. But they never got any farther than words, save for an occasional burning of a rebel.

Finally some one broke a way out of the impasse. He declared in plain language that the whole Golshok business, from start to finish, was nothing but 'words, words, words,' that the wise men had been chasing their tails for centuries, with 'the solution no nearer now than then.' He declared, moreover, that if people would conduct their lives upon human principles instead of Golshok principles they would be much better off.

Of course the wise men had him burned to death and his ashes scattered to the four winds. But they were too late. The secret was out. The common people went around saying, 'There ain't no Golshok.' And they lived happily ever after.

And so it has been with 'Mind.' 'Mind' is a noun. A noun is a name of something. Therefore there must be something in the cosmos that *is* mind. A person has a mind; it is possible for him to 'lose' it. Thus 'mind,' an entity, a 'thing-in-itself,' was created and projected into the cosmos. Then people set about trying to find it as they have been searching for truth, the good and beauty, these many weary years. One might as well search the cosmos for $\sqrt{-1}$. Philosophic tail chasing, nothing more.

Organic phenomena are distinguishable from inorganic phenomena: the former have a cellular structure, they appropriate items in their environment and assimilate them into their own cellular structure. Organic bodies move, react, behave. We may distinguish two categories of reactions of living beings—(1) the reactions of parts of the organism with reference to other parts, and (2) the reaction of the organism as a whole, as a coherent unit, to its environment. The reactions of the first category constitute the field of the physiologist; those of the second category the province of the psychologist. The reacting, behavior, of any living organism as a whole, as a coherent unit, with reference to its environment, is minding, or mind.

This commits us to such statements as 'An oyster has a mind.' Similarly, a paramecium, a radish, a lichen, have 'minds.' It may sound ridiculous to say that a radish has a mind. But it sounds much less ridiculous to say that a radish *minds, i.e.,* reacts to its environment, behaves, does something as a unit. So much are we at the mercy of words that even so slight a change as one from noun-use to verb-use makes the whole world look different. All living creatures possess the property of reacting to external stimuli as coherent, organic units. Mind is coextensive with life.

We come now to kinds of minding, kinds of reacting or types of mind. Obviously organisms behave differently as their structures differ. The mind of man is not the same as the mind of ape or starfish or radish. There are patterns or types of minding or mind, just as there are patterns or types of structure. This does not mean, however, that a classification of patterns of reacting would correspond, point for point, with a classification of structures; classifications may vary legitimately with point of view and purpose. The classification of types of reaction, of mind, has not been well worked out as yet.[2]

To return to our starting point: what is mind? How can a mind have a body?

[2] In 'The Mentality of Primates' (*Scientific Monthly,* Vol. 34, January, 1932) the present writer set forth a brief and preliminary sketch of types of mind. He has since refined and amplified this earlier statement, and plans to publish his results soon.

The solution: mind is minding, the reacting of an organism as a whole, as a coherent unit (as distinguished from the reacting of parts of the organism with reference to other parts). Mind is a function of the body. The 'organ' of the mind is the entire organism functioning as a unit. Mind is to body as cutting is to a knife.

But Alexander merely *cut* the Gordian knot; he did not untie it. Neither have we 'solved' the mind-body problem, for in the form in which it has plagued the reflecting portion of mankind, it is insoluble. But we have disposed of it. We have not proved, nor can it be proved, that there is no cosmic entity, mind, which has an existence independent of bodies. We have not proved that the 'fundamental reality' is not mind, of which bodies are but material expressions. So far as the present writer knows, there is no convincing proof for the non-existence of Santa Claus. Mankind progresses, often, not by disproving propositions but by outgrowing them.

The 'Mind-Body' problem is of one piece with the Vitalism-Mechanism controversy. No one has ever 'disproved' the theory of Vitalism, but scientists, and many philosophers, are agreed that the time has come when it should be ignored as obsolete, outgrown and, above all, sterile. It is not that the philosophy of Mechanism is True (with a capital T) and that of Vitalism False. It is that Mechanism has been fruitful, productive; Vitalism barren and sterile. Vitalism as 'a view is exactly opposite to those which *have led to all the scientific progress that has been made,*' declares Professor H. H. Newman.[3] Biologists have 'clung to the materialistic or mechanistic explanation of life, simply because *it was the only way in which progress could be made*' (emphases ours), declares the distinguished paleobiologist, Professor Ermine C. Case.[4] The philosopher Bertrand Russell declares: 'To invoke a vital principle is to give an excuse for laziness . . . the opposite view [mechanism] is, scientifically, a more fruitful working hypothesis.'[5]

And so, while we have not proved that mind is not some cosmic entity, or proved that it is not the 'real reality,' we have shown that this view is barren and sterile at its best and confusing and paralyzing at its worst. The opposite view, that mind is minding, or behavior, that mind is a function of the body, releases us from the verbal bondage of a sterile and a paralyzing metaphysics, and sets us free to sow and reap in a field that will bear fruit.

[3] In an essay, 'The Nature and Origin of Life,' in *The Nature of the World and Man* (H. H. Newman, ed.), p. 164, Chicago, 1926.

[4] In *The Michigan Alumnus*, p. 3, March, 1934.

[5] *Philosophy*, p. 25, New York, 1927.

But ...

PROFESSOR LESLIE A. WHITE, in the February (1939) number of THE SCIENTIFIC MONTHLY, has attempted to convince the philosophical world that the so-called 'mind-body problem,' which has been a chief concern of the greatest think-

[6] EDITOR'S NOTE: Professor Jared S. Moore of the Department of Philosophy, Western Reserve University, Professor White, and the editors of *The Scientific Monthly* have courteously permitted us to reprint this discussion of 'Mind is Minding.' The discussion appeared in *The Scientific Monthly*, Vol. L (April, 1940), pp. 365-366.

ers since time began, may be shown to be no problem at all by the simple device of substituting the participial form 'minding' for the more familiar substantive, 'mind.' This is as bold a step on the part of a scientific anthropologist as would be the endeavor of a philosopher to prove by some linguistic legerdemain that the problem of the origin of the human species has no meaning.

As a matter of fact, Professor White's suggestion is at least as old as Aristotle, and his analogy that 'mind is to body as cutting is to a knife' was actually used by the Stagirite himself. And to-day the world is full of psychologists and philosphers who have been saying practically the same thing for years. These facts do not make the theory true, however, and all who try to explain away the mind-body problem in this cavalier fashion overlook some important considerations.

There are two distinct parts to Professor White's thesis, between which, however, he fails to discriminate; and yet only confusion can result from such a failure. We need not quarrel with the assertion of his title that 'mind is minding,' an activity rather than a thing; but when he goes on to identify 'minding' with behavior ('Mind is minding, or behavior')—with reaction to environment—we must demur. It is perfectly allowable either to consider 'minding' a *variety* of behavior, or to restrict the term 'behavior' to overt acts and treat 'minding' as a quite different kind of activity, but it is simply fallacious to identify the two types.

Under 'minding' are included such activities as thinking, remembering, feeling, desiring, etc.; for as mind is minding, so thought is thinking, memory is remembering (or a name for the capacity of remembering), etc. But such overt acts as walking, talking, climbing, approaching, retreating, etc, belong to an entirely different category from the former. Walking, indeed, is a 'function of the body,' and so are the other activities in the second list; but it is simply nonsense to speak of thinking, remembering or 'minding' as 'functions of the body,' as do Professor White and others of his school. Both these sets of activities are functions of one *ego*, it is true—*I* think, *I* walk, *I* desire, *I* act—but they are two entirely different kinds of functions. For one of these sets the word 'behavior' is especially appropriate, and for the other set some such word as 'mentation' (or 'minding,' if one prefers); and the words 'body' and 'mind' respectively refer to that aspect or part of the *ego* which is especially concerned with the corresponding one of these two kinds of activity. Whether these should be described as 'parts' *or* 'aspects' of the self is precisely one of the points at issue between different theories of the mind-body relation; but no amount of verbal gymnastics can possibly eliminate the *problem* of that relationship.

JARED S. MOORE.

Still...

PROFESSOR MOORE'S criticism of my paper raises two points: (1) Are 'mind' and 'matter' two different kinds of reality, different entities, or is mind merely a property of matter in cellular (living) form? (2) What class of phenomena shall we label with the word 'mind'?

(1) As indicated in my article, all scientific progress in biology and psychology has been made on the basis of the materialistic, mechanistic assumption that 'life' and 'mind' are merely proper-

ties of matter-organized-in-cellular-form, just as iron or 'iron-ness' is a property of one kind of organization of protons, electrons, etc., while 'goldness' is the property of another kind of organization of the same sort of particles. How 'matter' —carbon, iron, calcium, etc.—can come to have cellular form and manifest those properties which we call 'life' and 'mind' is, however, a real problem—to the solution of which 'linguistic legerdemain' can not, of course, contribute anything. But neither can the philosopher. This is a task for the scientist—the physicist, the biochemist, the biologist.

(2) To what class of phenomena shall we attach the label 'mind'?

The behavior of any living organism has two aspects: intra-organismal and extra-organismal, *i.e.,* processes whose locus is within the organism, and reactions between the organism and the environment. 'Intra-' and 'extra-' are merely aspects (not parts) of the integral process which is living. Thinking, remembering, desiring, etc., belong to the within-the-organism category; walking, climbing, etc., to the reaction-to-the-environment category. Now the question is, To which category shall we apply the word 'mind'? Professor Moore wishes to restrict it to the within-the-organism category. I wish to restrict 'mind' to the reaction-to-the-environment category — with one exception which will appear in a moment. All definitions are arbitrary. But some definitions are better than others, better in the sense that one tool is better than another for a given purpose. I believe that my definition is the more fruitful one for science.

We agree with Professor Moore when he declares that thinking and walking belong to 'entirely different categories.' We agree also that it would be 'fallacious to identify the two.' *But,* there is an important point which Professor Moore overlooks. Although logically distinct, 'mind' and '(overt) behavior' are *biologically inseparable.* Furthermore, the *only way* in which the scientist can observe thinking, desiring, etc., in *all* the lower animals and in *all human beings except himself,* is *in terms of overt behavior* — such as 'walking, talking, climbing.' The limited and defective observation of *one single mind* (*i.e.,* one's own, through introspection) is not sufficient for the scientist. Thus, the scientific study of mind (thinking, desiring, etc.) *is and must be*—except for the meager and dubious contribution of introspection—the *study of the reactions of organisms to their respective environments.*

The scientist, like the philosopher, insists that his categories be logically valid. But mere logical validity is not enough; his categories must be useful, fruitful, as well. To insist, as Professor Moore does, upon keeping 'mind' and 'behavior' separate and apart is to render the study of mind sterile and to leave the phenomena of behavior unintelligible. It is precisely because the scientist freely employs the data of the one category to illuminate and render intelligible the other — in a sort of cross-fertilization process—that his labors become fruitful. Far from being 'simply nonsense,' the interpretation of mind as overt behavior has shown itself to be the most effective way of studying mind that we have at our disposal to-day. Also, it provides the most satisfactory way of disposing of — if not of 'solving'—the mind-body problem.

To cherish the 'mind-body problem' upon which the 'greatest thinkers' have lavished their genius 'since time began' without having brought the solution 'any nearer now than then' may be dear to

the hearts of some philosophers. But to-day, when science yields such abundant and much-needed returns for intelligent endeavor, it seems a waste of time to continue to wrestle with a problem that has defeated 'the greatest thinkers' for ages. How long should a hen brood on a hard, roundish, white object before she concludes that it is not an egg but a door knob?

LESLIE A. WHITE

That is precisely what common sense is for, to be jarred into uncommon sense. One of the chief services which mathematics has rendered the human race in the past century is to put 'common sense' where it belongs, on the topmost shelf next to the dusty canister labeled 'discarded nonsense.'

E. T. BELL, *The Queen of the Sciences*

◆

If you have had your attention directed to the novelties in thought in your own lifetime, you will have observed that almost all really new ideas have a certain aspect of foolishness when they are first produced.

A. N. WHITEHEAD, *Science and the Modern World*

◆

The empiricist . . . thinks he believes only what he sees, but he is much better at believing than at seeing.

G. SANTAYANA, *Scepticism and Animal Faith*

◆

Fourthly, another great abuse of words is the taking them for things. This, though it in some degree concerns all names in general, yet more particularly affects those of substances. To this abuse those men are most subject who confine their thoughts to any one system, and give themselves up into a firm belief of the perfection of any received hypothesis; whereby they come to be persuaded that the terms of that sect are so suited to the nature of things, that they perfectly correspond with their real existence.

LOCKE, *Concerning Human Understanding*

◆

We can classify the things of which we have any knowledge in two groups as *living* and *non-living* matter. A piece of chalk or a motor bicycle are examples of non-living matter. A frog or a university professor are examples of what is called living matter. Biology is the study of things which belong to the latter class. It is sometimes defined as the science of Life. This is misleading. Science is not the study of abstract nouns. The practice of dealing with facts instead of words is what distinguishes science from metaphysics.

LANCELOT HOGBEN, *Principles of Animal Biology*

VOCABULARY AND INTELLIGENCE

CHARLES I. GLICKSBERG

[EDITOR'S FOREWORD: Because of the wide publicity given to the views of Johnson O'Connor on the alleged correlation between the possession of a large vocabulary and 'success' in business or the professions, and because of the popularity of these views among certain groups of linguistically naive educators, the question is often asked, 'What do you semanticists think of the Johnson O'Connor theories?' The Editor does not know what 'we semanticists' think of these theories, but he does know that linguistic scholars have always regarded them with suspicion. Dr. Glicksberg, whose attainments in American literature scholarship are widely known and respected, is also, as shown by his article on Korzybski and Freud in our last issue, well versed in general semantics. His article on 'Vocabulary and Intelligence,' while not originally intended as a contribution to general semantics, nevertheless brings to the analysis of the Johnson O'Connor theories the kind of good sense and linguistic sagacity that our readers will recognize, except for slight differences in terminology, as an excellent example of general-semantics-in-action.

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THE prestige commonly attached to 'science' has been won by slow, hard, patient labor. Fully justified are the honors it has received. Research carried on within the laboratory bears the stamp of tested truth. But it is a reversal of the scientific attitude to accept uncritically whatever presumes to pass itself off as science. Particularly in the field of education has the attempt repeatedly been made to reduce theories and hypotheses to scientific law. But what is scientific? There is a strong tendency to confuse statistical sampling with scientific procedure. Statistics prove much or little, depending on how they are gathered and how they are interpreted. Since the material with which education deals is human and therefore both complex and variable, almost any generalization that the writer on education advances, is bound to have some degree of validity. If, in addition, it is buttressed with flying graphs and piles of figures, then the case in court is seemingly won.

Statistical tabulations in the fields of vocabulary testing afford an excellent point of departure in considering the relation of education to science. For many years teachers have labored, although with indifferent success, to increase the vocabulary range of their pupils. They administered diagnostic vocabulary tests which were supposed to measure a pupil's vocabulary level. Once this was measured, what did the test prove? What conclusions was the educator warranted in drawing? Was the

final score a good indication of intelligence, of intellectual capacity, of word mastery? Did it help to evaluate the pupil's qualitative understanding of words and the ability to *use* them effectively? Did the test also measure thinking, interest, the apprehension of general ideas?

The Hoboken Human Engineering Laboratory has devised a series of vocabulary tests based on reputedly 'scientific' principles. The Laboratory contends that its worksamples give reliable and consistent results. Not only that, but vocabulary scores, it is alleged, provide a significant predictive clue to success both in school work and in later life. A large vocabulary is supposed to insure success in a majority of occupations and professions. Since the individual can by conscious effort greatly increase his vocabulary, the implication is clear that this is a safe and straight road to vocational success.

The tests furnished by the Hoboken Human Engineering Laboratory are intended to measure, and do measure, quantitative results. Progress is made by looking up words in the dictionary. The 'scientific' procedure consists in arranging words according to their level of difficulty. The *Johnson O'Connor Vocabulary Builder* lists words in this manner. 'All of the words in an English dictionary,' this book declares, 'can be arranged in the order of their level of difficulty—that is, it is possible to prove that the word *sense*, for example, is less difficult than the word *sensuous;* and that *sensuous*, in its turn, is less difficult than *sensible.*' It is hard to understand why this should be so. There is no such thing as verbal difficulty in isolation. It is possible to use familiar and seemingly simple words to express a thought which many pupils, although possessed of definition, cannot grasp. And what words are familiar to pupils will depend on their interests, their previous experiences, their reading background, their mental attitudes. The listing of words as a means of extending the vocabulary range of pupils is almost as futile and wasteful an undertaking as that of attempting to teach young children the English language merely by drilling them in the mechanics of grammar. It is an exercise in mnemonics, and in most cases has no vital functional relation to thinking or expression.[1]

The challenging thesis implicit in the plan drawn up by the Hoboken Human Engineering Laboratory is that vocabulary plays a decisive part in making for success. The alleged correlation between the possession of a large vocabulary and professional or occupational success is responsible for starting a boom in the vocabulary-building market. The appeal is directed to motives to which the majority of the American people are peculiarly susceptible. Who does not wish to become successful? And is there any lurking doubt as to what constitutes success? It is worldly success, of course; success measured in terms of income, wealth, social and business recognition. The reasoning is deceptively simple; to the

[1] EDITOR'S NOTE: It should also be remarked that the *Johnson O'Connor Vocabulary Builder* makes the assumption that the more common a word is, the 'easier' it is. Lexicographical experience shows that the reverse is more likely to be the case, namely, that the 'harder' a word is in the popular apprehension (because it is heard rarely), the easier it is to define. 'Easy' words, such as 'get,' 'come,' 'go,' 'like,' 'face,' etc., being in everyday, unregulated, colloquial usage, are, in point of linguistic fact, extremely complicated. Without realizing that we do so, we give them a wide variety of meanings and fit them arbitrarily into widely differing syntactical relationships. See, in illustration of this point, the treatment of the word 'let' in the *Oxford English Dictionary.*—S.I.H.

uninitiated it must appear both impressive and convincing. If it can be shown that men eminent in their field—executives, captains of industry and finance, leaders in the business world—achieve a uniformly high score on the standardized vocabulary test, then the conclusion is unavoidable: knowledge of vocabulary is causally related to intelligence, achievement, ultimate success. This is exactly what the Human Engineering Laboratory contends. 'An extensive knowledge of the exact meanings of English words more often than any other single characteristic accompanies outstanding success in this country. . . .' That appears to settle the matter once for all. The results speak for themselves. On the tests, college seniors are superior to college freshmen; major executives—those who for ten years or more have been president or vice-president of a business organization —make fewer errors than college professors. What is even more eloquent testimony, there is a measurable correlation between the vocabulary score and the salaries of executives.

This philosophy of vocabulary building is a trumpet call for all good men to enroll in the army of progress, to join the universal Church of Success. And the method is simplicity itself: all one has to do is to study faithfully, and memorize, a graduated list of words that spell success.

Unfortunately the method is both philosophically and psychologically without foundation. Its conclusions are not supported by experimental research of a convincing character. The emphasis it places on the study of words in isolation is symptomatic of a spreading faith in verbalism. The word as a thing-in-itself, the word as a source of power, the word as the open sesame to success—these are the spurious uses to which language, under such a dispensation would be put. It is necessary for classroom teachers to examine for themselves and expose the false premises on which this method is grounded and to dissipate the cloud of confusion it has generated. Against this verbal fetichism they have no other recourse but to stress the organic nature of language, the essential and redemptive discipline of experience, the need for getting hold of the world of concrete things and perceiving their complex interplay of relationship, the need for insight and reflective thinking.

If the contention of the vocabulary experts is correct, if there is a direct and measurable correlation between vocabulary level and intelligence, then the schools are doing the right thing in concentrating on word lists and formal dictionary training. The acquisition of a large number of words then becomes an end in itself, a study which pays a high rate of interest. The goal is alluring. Master the ability to recognize the meaning of many words and the world is your oyster. Hence the methodological justification of the process whereby words are graded according to their order of difficulty. Hence, too, the 'scientific' warrant of compiling vocabulary tests which can measure with precision the level which a person has reached. Once that diagnostic information has been received, it is merely a matter of feeding the pupil the kind of verbal pabulum which he is prepared to digest. One can draw up a diet which exactly suits his vocabulary needs.

Dr. David Wechsler, in *The Measurement of Adult Intelligence,* declares on the basis of wide experience with the vocabulary test that it does furnish an excellent measure not only of previous education but also of general intelligence. 'Its excellence as a test of intelligence is seemingly derived from the fact that the

number of words a man knows is at once a measure of his learning ability, his fund of verbal information and of the general range of his ideas. The one serious stricture that can be made against the Vocabulary Test as a measure of a man's intelligence is that the number of words a man acquires must necessarily be influenced by his educational and cultural opportunities.' His experience indicates that, with the exception of special cases, the factors of schooling 'influence the effective range of an individual's vocabulary much less than is commonly suspected.' Now if the last statement is true, it immediately puts a crimp in the plans of the educators who would increase intelligence by enlarging a pupil's vocabulary.

It is not at all surprising that there is some kind of correlation between vocabulary and intelligence, though exactly how it operates and how it should affect educational practice will have to be left to future experimentation. People possessed of keen and quick intelligence are eager to acquire knowledge. Those who have mastered a large vocabulary may have benefited from different educative experiences: travel, reading, conversation with friends, rearing in a cultured home. It is at this point that the vocabulary expert commits a fallacy. If people of high intelligence achieve a high vocabulary score, then why is it not possible to cultivate the intelligence of pupils by increasing their vocabulary? They can be fed verbal symbols as a child is fed vitamins.

The procedure ignores the fundamental consideration that words are not the ingredients of intelligence. We do not acquire intellectual stature by swallowing parts of the dictionary each day. If there were an invariable correlation between size of vocabulary and greatness of intellect, then our lexicographers would be entitled to highest honors in the pantheon of genius. The dictionary would then become the road to greatness, the Cabala of wisdom, the be-all and end-all of knowledge. That this is not so is too obvious to need argument. It is not the number of words that we know which counts but what we do with them.

II

What support is there for assuming that vocabulary tests do measure the quality of intelligence? Words, to be sure, are essential in conceptual thinking, but tests that demand the recall of definitions do not exercise the power of reasoning or analysis. The vocabulary test does not achieve its declared aim. It does not measure intelligence. Mastery of meaning is intimately associated with the functioning of intelligence, but vocabulary tests do not measure mastery of meaning. The light is focused on the bare, skeletal aspect of words; the connotative complexity of words in action is ignored.

Vocabulary cannot be adequately taught without insight into the way the mind actually works. The assumption underlying vocabulary testing is that words may be graded and arranged in a list from the comparatively simple to the progressively more difficult, and that by learning these words the vocabulary growth of pupils can be pedagogically stimulated. The assumption falls to the ground, however, if we can demonstrate that words do not posses an intrinsic order of difficulty, that words may be puzzling in one context and readily comprehensible in another.

The point is simply that neither the phrase nor the sentence is the unit of discourse. Meaning is an organic whole. The unit of discourse consists of an inter-

dependent and interanimating arrangement of words in a pattern sufficiently meaningful to communicate the meaning of the whole as well as of the component parts. Words cannot be exiled from their native habitat. It is only when they are combined in discourse that we are able to grasp their intended meaning.

In *How We Think,* John Dewey declares that a linguistic sign may be used as a fence, a label, and a vehicle. The first function separates, clarifies, and delimits meaning, giving it shape, structure, a coherent outline. The second function enables us to conserve meaning by remembering the linguistic sign. It is a tool of preserved meanings. The third function makes it possible for us to transfer meaning to a new situation. According to Dewey, symbols acquire meaning for any given individual 'only when the meaning has been first involved in our own direct intercourse with things. To attempt to give a meaning through a word alone without any dealings with a thing is to deprive the word of intelligible signification. . . .' In brief, vocabulary is enlarged, not by studying a list of ten or fifteen 'scientifically' graded words each day, but 'by wider intelligent contact with things and persons, and also vicariously, by gathering the meanings of words from the context in which they are heard or read. To grasp by either method a word in its meaning is to exercise intelligence, to perform an act of intelligent selection or analysis, and it is also to widen the fund of meanings or concepts readily available in further intellectual enterprises.'

All this runs contrary to the belief of the vocabulary drill masters. The objective of extending the vocabulary of pupils is desirable, and there is no reason why it should not be done efficiently and systematically. No one for a moment denies that pupils need help in acquiring meaning. They lack initiative and resourcefulness; they are often unable to analyze their semantic deficiencies or to adopt the proper method of remedying these deficiencies. But the method of listing words and cramming definitions is, as we have seen, psychologically unsound. It removes words from their natural context. Not every context, to be sure, whether one of experience or expression, is of itself sufficient to furnish clues to meaning; but when the context is within the range of comprehension of the pupil, he is able to derive a new meaning, a new symbol; and, in any event, any context is better than no context at all.

An example will perhaps serve to illustrate the point. The story is told of a group of children interested in studying heavier-than-air craft. They did the work of cutting the outlines of their wings on the electric saw. While engaged in the work of construction, they wanted to know the meaning and use of various parts. 'They discussed the need for camber and leading and trailing edge of the stabilizer, also the streamlining of the rudder. They wanted to know the purpose of the negative angle, the tilting of wings and the effect of wind; they discussed the use of the wind for testing models.' As reported in the Twelfth Yearbook of the Department of Supervisors and Directors of Instruction, *Newer Instructional Practices of Promise,* there were many problems which the pupils wished to solve: the necessity for dihedral angles, the principle involved in computing the differences in the surface of the air and air pressure when the wing is tipped, the weighing of the nose, the force of gravity.

The moral is plain for all to read: the powerful motivation of interest sustained

the pupils in their work of research and construction. Particularly important is the by-product: their rapid command of words and ideas far beyond their initial range of experience and understanding. The gap was bridged, the difficulty overcome by doing, by experimenting, by resolving the tension set up between theory and practice, by seeing, touching, handling, working. How else could these youngsters have learned what is meant by the law of lift, the area of suction, the camber, the stabilizer, the streamlining of the rudder, the need for a dihedral angle, the force of gravity? Certainly not by looking up their meaning in a dictionary.

The prevailing attitude towards vocabulary study, especially in the simplified and standardized form which would break up the dictionary into a series of graduated lists, is strikingly similar to the attitude of static Logic. Just as for Aristotle there are established forms, substances, essences, entities, and faculties, which must be properly defined and categorized, so for the proponent of vocabulary study by means of formal definitions, words are things possessed of established and changeless attributes. Such a method of linguistic training ignores qualitative differences, dynamic interrelationships, the purpose of communication, the relation of the symbol to experience. The determination of meaning in a given context involves the use of reasoning, the solution of a problem, the orientation of the self to the world and to society. The language function is to be understood, not abstractly, but in conjunction with what we do in social behavior. Meaning is functional. The symbol depends for its efficiency upon its relation to a complex act. It is the result of a creative operation. In *The Symbolic Process,* John F. Markey declares: 'Causally or functionally speaking, the meaning for a person of any act or object exists in the total response to it both mnemonic and original in association with other individuals and objects.'

III

The protest against the doctrine that intelligence can be adequately measured by vocabulary tests and that it can be developed by studying lists of words classified according to their order of difficulty, comes to a head in the realization that the use of the dictionary is no substitute for the mediation of experience and reflective thinking. The dictionary meaning supplies little more than a body of synonyms. A dictionary knowledge of a word cannot compensate for the need of direct contact with and full understanding of the thing for which the word stands. Meaning depends essentially, not on verbal recognition alone, but on the understanding that is born of experience. Each word is a miniature autobiography, a subjective history.

No one denies, once more, that vocabulary tests do measure something, but they do not measure what the compilers of the tests would have us believe. Pupils who are capable of dynamic thinking, pupils who use the language vigorously, will no doubt achieve high scores on these tests, but it is not these pupils who are, as a rule, the object of pedagogic solicitude. They do not need saving. It is the slow readers, the mentally inert, the inarticulate and the semi-illiterate, who need the guidance of teachers. And for them these vocabulary tests are not reliable indicators of value. To serve that purpose, they would also have to be a valid measure of intelligence. That is the central question at issue. Vocabulary tests do not measure intelligence because they do not operate on a level deep enough to require the use of reflective

thinking; they are for the most part tests of verbal responses. They do not determine the connotative value of a given word-meaning, its vividness and width of association, its liveliness of recall, the frequency and readiness with which it is recognized in qualitatively different contexts. Then, too, they do not measure the ability of the pupil to use the verbal concept dynamically in his thinking. To discover these things, the standardized vocabulary tests are inadequate.

In terms of concrete educational practice, what are the implications of the thesis herein advanced? First, it is advocated that words cannot and should not be studied in isolation. Associated with this as a corollary is the belief that our vocabulary expands in conformity with our increasing needs and our widening range of experience and insight. Next, it is urged that experience precedes expression, that our vocabulary grows in geometric progression as the result of our interaction with things and people in our social environment. Hence the object of the schools should be to create a setting of rich and varied and meaningful experiences which will give rise not only to an enlarged vocabulary but to what is more important, an understanding of fundamental relationships. Finally, there is the assumption that the objectives of vocabulary study should not be the accumulation of words and more words. What will pupils do with the words once they have been put into mental storage? Words are responses to needs, the coin of experience, the medium of understanding and communication. When they do not directly deepen our understanding or facilitate our power of communication, the words we have added to our store constitute so much dead wood; they atrophy for want of use. The supporters of the scientifically graded vocabulary lists argue that these words anticipate future needs. While it is important to provide intelligently for these needs, it is uncritical and wasteful not to consider the dominant interests and the out-reaching curiosity of pupils. Future needs can be based only upon life experienced in the present. If we persist in our efforts to force a huge stock of words upon our pupils, we run the serious danger of infecting them with the virus of verbalism.

Further research is urgently needed in the field of vocabulary study. English teachers can make a notable contribution by devising more valid and fruitful methods of teaching pupils to master their language.

ON THE SUBJECT-PREDICATE FORM

The belief or unconscious conviction that all propositions are of the subject-predicate form—in other words, that every fact consists in some thing having some quality—has rendered most philosophers incapable of giving any account of the world of science and daily life.

BERTRAND RUSSELL, *Our Knowledge of the External World*

The alternative philosophic position must commence with denouncing the whole idea of 'Subject qualified by predicate' as a trap set for philosophers by the syntax of language.

A. N. WHITEHEAD, *The Principle of Relativity with Applications to Physical Science*

GEORG CHRISTOPH LICHTENBERG:

An Eighteenth Century Pioneer of Semantics

RICHARD D. LOEWENBERG[1]

I

'Men expect so much nowadays from America that one might say, the wishes, at least the secret ones of all enlightened Europeans, have a Western deviation as our magnetic needle.' (G. CH. LICHTENBERG, 1742-1799)

'One of the human tragedies can be found in the fact that wise epigrams do not work. It takes a system which often expresses similar notions.' (ALFRED KORZYBSKI, 1933)

WE are convinced that it is not accidental that the foundation of general semantics was laid by an engineer in this country and in this epoch. Any student of the history of physics in the eighteenth century must be aware how close the leading scientists came to modern advances in semantics and epistemology. An early precursor of Helmholtz, Mach, Einstein, and Korzybski, however, has been entirely forgotten, even in Europe; due to the inaccessibility of his writings, which were never translated nor republished, he is nowhere quoted. Believing that the history of science is science itself, we may be justified in presenting some highlights of this neglected author, who was one of the keenest minds that ever lived. A spirit of the rank of Voltaire, Swift, and Franklin, he was never recognized at any time by his native country.

As the eighteenth child of a Protestant pietist preacher, Georg Christoph Lichtenberg (1742-1799) was born near Darmstadt. He entered Goettingen in 1763 and became in 1769 professor of experimental physics. Suffering during his latter years from the complications of an early acquired cyphosis, he died there in 1799. His many contributions to the physics of his time, which have been reviewed by Hahn[2] can be understood in detail only by an expert. But at least some of his scientific contributions must be mentioned here because they give the background to his philosophical ideas.

He introduced the symbols positive (+) and negative (−) in the science of electricity; he discovered the electrical dust figures named after him. In the dispute about the nature of electricity, he inclined to Franklin's unitarian theory. A small moon crater bears his name, and he was the first in Central Europe to experiment with the lightning rod and little

[1] Dr. Loewenberg, formerly assistant in Neurology and Neuropsychiatry at hospitals in Hamburg and instructor in Neuropsychiatry and consultant for Nervous Diseases in Shanghai, is now a member of the staff of Western Pacific Railroad Hospital, Portola, California. Previous papers of his have appeared in *Johns Hopkins Hospital Bulletin, China Medical Journal, Journal of Clinical Medicine, Journal of Criminal Psychopathology, etc.*

[2] Paul Hahn, *Georg Christoph Lichtenberg und die exakten Wissenschaften*, Göttingen, 1927.

balloons filled with hydrogen. Later he complained how close he had come to anticipating the Montgolfier brothers.

A widespread correspondence connected him with Priestley, Herschel, De Luc, Volta, Kant, and Goethe. He vainly tried to convince the poet of Newton's chromatics. Goethe felt deeply hurt that his physiological chromatics were not mentioned in Erxleben's compendium of physics, edited by Lichtenberg. Kant was anxious to have Lichtenberg as reviewer of his work. Volta demonstrated to him his new experiments.

Lichtenberg, who worked until the end of his life at Goettingen's University, which belonged at that time to the English crown, was a deep admirer of England. His two visits to England in 1770 and 1774-5 were the greatest events of his life.[3a] He was received by all the prominent scientists and artists of that era. The works of Hogarth and the art of the great Shakespearean actor Garrick impressed him so deeply that he published extensive commentaries on them.[3]

This pro-English attitude is likewise reflected in a remarkable letter on the tragic death of the unfortunate Major André, who visited him in Goettingen before the American Revolution. It is also shown in a disappointed and bitter letter he wrote to a friend in England: 'Indeed, my heart bleeds when I think that England still exists and I cannot be there . . . my distance from England sometimes becomes intolerable. Man is nowhere so much appreciated as in that country, and everything is enjoyed there with spirit and body, something about which one only dreams under soldier governments.' Frequent remarks like this may have contributed to the amazing fact that for one hundred years a complete edition of his works was never republished by his countrymen, who used to issue thirty thousand new books every year.

Lichtenberg occasionally wrote in English to express himself more concisely. He called his notebooks for his first entries of aphorisms his 'waste books,' the name English merchants gave to their preliminary daily log books. Besides being fluent in French and Latin and several other languages, this universal polyhistor was a sharp critic of all nationalistic narrow-mindedness wherever he met it. His incorruptible skepticism of over-patriotism, politics, and other perversions of human interrelationships is the most merciless in world literature.

However, more important than these writings were his private daily notes in his workbooks. Never intended for publication, they contained his secret monologues, his introspective observations, his dream investigations, and his reflections and speculations. 'Colors are ground here,' was his own characteristic description of this unique workshop which covered the whole field of human activity.

Elsewhere[4] we showed him as a forerunner of modern psychology. We could do the same for mathematics, physics,

[3a] *Lichtenberg's Visit to England as Described in his Letters and Diaries*, Oxford, Clarendon Press, 1938.

[3] See his letters from England and commentaries on Hogarth in *Vermischte Schriften*, (Neue vermehrte, von dessen Söhnen veranstaltete Original-Ausgabe), 8 Bde., Göttingen, 1844-47. See also Lichtenberg, 'Aphorismen', (nach den Handschriften herausgegeben von A. Leitzmann in: *Deutsche Literaturdenkmale des 18. und 19. Jahrhunderts*), Heft 1-5, Berlin, 1902-08; Lichtenberg, 'Aphorismen,' in: *Insel Bücherei*, Bd. 33; R. K. Goldschmit, *Lichtenbergs Werke*, Stuttgart, 1924.

[4] R. D. Loewenberg, 'Lichtenberg als Psychologe,' *Zeitschrift für die gesamte Neurologie und Psychiatrie*, Bd. 128, 1930, pp. 269-280.

and geology, but are limiting ourselves here to semantics and epistemology. Even within these limits we hope to preserve something of the literary fascination and enjoyment of observing this workshop of ideas in the making.

The historical background should be kept in mind, since some parallels to our times are evident. Kant's fundamental works had just appeared, and were understood, like Einstein's formulations, only by a small minority. The phenomena of electricity opened up an entirely new field of physics. The French Revolution had stirred up the best minds to controversy, just as in our days did the events in Russia. But on the other hand one should not forget that Lichtenberg's ideas were written down nearly a century before the beginnings of Darwin, Helmholtz, Pavlov and Freud, and one hundred and fifty years before the publication of *Science and Sanity*.

The following selections are taken, as far as possible, from Leitzmann's[5] scientific edition, which surpasses in exactness the first and second edition of Lichtenberg's posthumously collected writings,[6] published by his son (1801 and 1844). These translations from the eighteenth century German are as close to the original as possible. But it should be remembered that even in the original these notes are unfinished, tentative, and informal.

II

'We can use Lichtenberg's writings as the most marvelous divining-rod; where he makes a joke, a problem lies hidden.' (GOETHE)

The different fragments, scattered through his essays, aphorisms and letters, are here rearranged according to his favorite subjects and supplied with titles which were often created by Lichtenberg himself. The translator's remarks, explanatory additions, and parallel renditions of different passages are given in parentheses.

[On Aristotle]

Nowadays our best heads get together [trying] to find out what Aristotle taught, and the dispute between mind and mind becomes a miserable squabble between philosophy and grammar. What is the use? Truly one spoils human nature when one believes the forming of an opinion requires the knowledge of what somebody else thought. As a support it might be all right. Why do men not study more physics and mathematics and rather look for Aristotle in themselves? We might be much further advanced, if, instead of trying to find out what the ancients taught who had so much less resources, we tried to find out what they ought to have taught.

Nothing is more painful to me in all my activities than to be forced to see the world as the common man does, for I scientifically know that he sees it wrong.

Pure philosophy indulges—and cannot avoid it—in making love to impure philosophy, without noticing it. And thus it will go on until the end of time.

[The World of Words]

The invention of language happened before philosophy, and this very fact makes philosophy so difficult, especially when one tries to make it understandable to others who do not think much. Philosophy, as soon as it speaks, is always forced to speak the language of Un-philosophy.

[5] 'Aphorismen,' *op. cit.*

[6] *Vermischte Schriften, op. cit.*

Therefore, I have often wished that there existed a language in which an error could not be said, or where every boner against truth would be also a grammatical error. [He adds immediately in his satirical vein that such desirable renovation would have sad consequences for the customary compliments at society meetings.]

I and Me. I feel me—are two things. Our false philosophy is incorporated into our whole language; we cannot talk, so to say, without talking incorrectly. We do not consider that speaking, irrespective of its content, presents a philosophy. Explaining words does not help; for I do not change, when I explain words, [the inherent use and relationships of] pronouns, and declension.

When we compare our words with things, we find that the latter progress in quite another sequence [progression] from the former. At times we have to examine the words all over again, for the world can move while the words stand still. Therefore, always THINGS AND NOT WORDS. For even the words 'infinite,' 'eternal,' 'ever' have lost their meaning.

[ON THE SIMULTANEOUS USE OF SEVERAL LANGUAGES]

Is it good and advantageous for our mind? I can hardly believe so. I do not mean only the loss of time—for it is evidently quite great—but I believe it is also psychologically harmful to have in our head so many signs for the same thing. There might exist a new quality where now a new sign stands for an old one.

[PSYCHOSOMATICS]

When I consider something first as *Body* and then as *Mind*, the result is a horrible Parallaxis. One might call this the somatocentric and psychocentric focus (angle) of a thing.

My body is the only part of the world which my thoughts can change. Even imagined diseases may become real. In the whole remaining world my hypothesis cannot disturb the order of things.

[He describes the title picture of Mach's *Analysis of Perceptions* (1886) one hundred and fifteen years before, in 1769, with these words:] The thing from whose eyes and ears we see nothing; from whose nose and head we see only very little—in short, our body.

I found frequently during my nervous spells that what merely hurt my moral feelings at any other time passed over into bodily feelings. When somebody said once 'God shall kill me,' I felt so sick [nauseated] that I had to forbid this man to enter my room for some time.

There are certainly just as many, if not more, people imaginatively sick as there are those who are really sick. There are just as many people, if not more, imaginatively sane as there are people who are really sane.

I recommend dreams once more; the right use of them has not been made. They might be used to show the unprejudiced result of our whole being without the compulsion of frequently artificial speculations.

[We do not have the opportunity here to show how carefully he studied, analysed, prepared, and repeated his dreams, which he wrote about in great detail, describing the borderline state between waking and sleeping. Possessed of a passion to observe human beings under all conditions, especially those among the lower classes, he made detail studies of the emotional reactions and the specific movements of individuals. These studies,

so greatly neglected and underrated today in academic circles, were often more dangerous, he wrote, than his experiments with the lightning rod. These studies, which are unique among the rationalists of this epoch, have been reported on elsewhere.][1]

The whole bone-structure of our way of thinking and our belief is formed from our heroes, and the selection of our models [ideals] occurs at a time when we have the least experience and reflection; ultimately, however, it works on our reflection and even on the trend and result of our experience.

[Recommending the training of children to start with physiology and anatomy, he continued:] If only one could educate children to that point where everything that is vague and indistinct would be entirely unintelligible to them!

It would be a good plan to have children write for the old people, since nowadays everybody writes for children.

God forbid that man, whose instructor is the whole of nature, should become a wax lump, in which a professor impresses his sublime image.

We must not conclude what man might be from what man is at present in Europe. In other continents he is already different, very much different. (Feb. 1777.)

There is hardly in the world a stranger ware than books. Printed by people who don't understand them; bought by people who don't understand them; bound, reviewed, and read by people who don't understand them; and even written by people who don't understand them.

[1] R. D. Loewenberg, 'The Significance of the Obvious,' *Bulletin of the History of Medicine*, Vol. X, No. 5, December 1941.

Prevalent opinions which everybody takes for granted usually deserve our most careful investigation. Judgment is pronounced upon nothing more hastily than upon the character of men, and yet in nothing should we be more cautious.

On the Application of Mathematics

[Lichtenberg's first printed paper was titled, 'On the benefit which Mathematics may bring to a *bel esprit*.' Throughout his life he tried to extend the power of the mathematical spirit beyond its original limits. Although he has little respect for the average mathematicians of his time, his passion and love for the unique superiority of mathematics breaks through again and again.] I believe yet that in the strictest sense there is only one science for man and that is pure mathematics.

The great trick to take small deviations from truth for truth itself—upon which the whole differential calculus is built—is also in the same way the ground of our witty ideas. The whole would easily fall down if we took the deviations in their philosophical strictness.

The motifs of our actions might be arranged like the thirty-two winds [on the compass card], and be named in a similar manner: Bread bread fame or fame fame bread.

III

'On the borderline always lie the strangest creatures.' (LICHTENBERG)

The picture of this ever wakeful spirit would be incomplete, however, were the darker side of his character not mentioned. He himself sketched these in his notes 'On the character of a certain person, known to me.' He was quite con-

scious of man's emotional foundation, so strongly manifest in his unsuppressed sensuality and his every day superstitions and mystic inclinations; they were the source of his apparent contradictions.

Tracing the ramifications of our instincts in every day life with the preciseness of a trained physicist one and a half century before Freud, this consciousness protected him from overdoing and overextending his mathematical passion into inaccessible realms. He warned that the knowledge of muscle physiology would not produce better dancers or pianoplayers, as so many optimists believe today.

Lichtenberg's beginnings in semantics were not successful. More competent studies will have to decide which of his building stones weathered the times, which have to be rejected. The abundance of his overflowing nature prevented him from any systematisation, the requisite for any practical effect and lasting success. Herein lies his greatest difference from Franklin, with whom he shares so much in common and whom he admired so deeply that he called himself a Franklinian. It is useless to ask whether in a free country he might have become an active force like Franklin. Tied up in a narrow provincial town under humiliating conditions, the cyphotic hypochondriac Lichtenberg languished behind his windows, unnoticed and forgotten as are so many brilliant minds at all times.

Lichtenberg was unsurpassed in the clearness of his methodical thinking, which is independent of temporary knowledge and achievements. His semantic awareness suspected incessantly his tools of knowledge. Like an astronomer, he always considered the personal equation of possible errors in his observations and conclusions. A true thinker for himself, as Schopenhauer called him, he will survive as one of the earliest good Europeans and one of the first pioneers of semantics who fought for a better world of science and sanity.[9]

[9] A. Aliston, *Reflections of Lichtenberg*, London, 1908.

The layman, the 'practical' man, the man in the street, says, What is that to me? The answer is positive and weighty. Our life is entirely dependent on the established doctrines of ethics, sociology, political economy, government, law, medical science, etc. This affects everyone consciously or unconsciously, the man in the street in the first place, because he is the most defenseless.

A. KORZYBSKI, 'The Brotherhood of Doctrines,' *ETC*, I, 57

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Consciousness is the feeling of negation: in the perception of 'the stone as grey,' such feeling is in barest germ; in the perception of 'the stone as not grey,' such feeling is full development. Thus the negative perception is the triumph of consciousness.

A. N. WHITEHEAD, *Process and Reality*

SCIENCE, COMMON SENSE AND DECENCY[1]

IRVING LANGMUIR

[FOREWORD BY A. KORZYBSKI: The following paper by Dr. Irving Langmuir was delivered over the radio December 26, 1942 as the address of the retiring president of the A.A.A.S. Dr. Langmuir is one of the outstanding scientists of our time, Associate Director of the General Electric Research Laboratory, Nobel prize winner in chemistry and winner of many different awards and medals from scientific societies here and abroad, a former president of the American Chemical Society, and a member of many American as well as foreign scientific associations. Dr. Langmuir specialized in a most fascinating of sciences on the border line between physics and chemistry. The range of his researches is unusually wide and includes, among others, kinetics of gas reactions, constitution of solids and liquids, structure of the atom, surface tension, electric discharges in gases, and the young sicence of surface chemistry, largely originated by him.

In this address Dr. Langmuir discusses some methodological issues which are involved in modern exact sciences and contrasts them with the prevalent methods which we apply in human affairs. Students of general semantics may be interested in this contrast as it turns out to be the difference between the new physico-mathematical orientations which include the principle of uncertainty (divergent phenomena), maximum probability, etc., and the old aristotelian orientations (convergent phenomena). In the terminology of general semantics we would say it is the contrast between the non-aristotelian infinite-valued causality and the aristotelian two-valued causality, which is a limiting case of the former.

The paper deals with the physico-mathematical standards of predictability, and so proper evaluation, which can not exist without tackling the problems of causality. The misunderstanding of those problems has led to a large extent to the harmful, frustrated cynicism regarding 'scientific methods' for the solution of human problems—a cynicism Dr. Langmuir remarks upon. The main difficulty lies in the ambiguity of using the unindexed and undated term 'scientific methods.' Dr. Langmuir evaluates by modern '*physico-mathematical methods*'; so do we in general semantics. What some others call 'scientific methods' is an enigma, with unspecified variables, which may range from the standards of Aristotle to those of a 'prominent modern sociologist,' who simply does not know what he is talking about (see paper of Professor Bell in this issue).

In the last paragraphs Dr. Langmuir describes his own neuro-semantic and neuro-linguistic reactions which produced his creative work. There is no doubt that what Dr. Langmuir has to say applies to the majority of creative men

[1] Reprinted with the permission of the editors from *Science News Letter*, January 2, 1943.

and women. It indicates the importance of 'intuition,' which in the terminology of general semantics we would call thalamo-cortical integration.

Speaking about the modern quantum theories, Dr. Langmuir says: 'As the implications of the uncertainty principle, especially as applied to divergent phenomena, are more generally recognized the limitation of the idea of [aristotelian two-valued] causality should have profound effects on our habits of thought. The science of logic itself is involved in these changes.' As suggested, this would be one kind of consequences and results. However, such a limitation would not be a constructive solution, since somehow the principle of some sort of causality is deeply ingrained in us. Perhaps, instead of limiting the principle of causality to the two-valued, traditional, aristotelian one, it would be more in agreement with the history of science, and beneficial, to enlarge the field of that principle to an infinite-valued causality, which becomes a necessity in the more flexible non-aristotelian system. Something of this kind already happened in 'mathematical logic,' where many-valued 'logics' are being formulated to fit the requirements of physics. Dr. Langmuir is right that such clarifications 'should have profound effects on our habits of thought,' as students of general semantics know by experience. This is a most important point, but obviously to be able to achieve those desirable generalizations of the principle of causality in daily life, we need appropriate special methods and techniques.

Dr. Langmuir says, 'I see no objection to recognizing that the field of science is limited.' With a non-aristotelian orientation we must recognize that the field of science is unlimited provided we bring common 'scientific method' to the high level of the physico-mathematical sciences and their methods. Today we know that this can be accomplished.

This article is unusually clear and informative to students of general semantics. However, it must not be forgotten that life in general, ourselves included, is only a further development of electronic and electro-colloidal processes, and if we, through the non-aristotelian methods of exact sciences, have been able to penetrate into some of the mysteries of the atom, it will be found that the application of the same methods may solve our human problems. This does happen, not by limiting physico-mathematical methods, but by generalizing them, and thus establishing a *science of man*. It is not a problem of exclusively quantitative methods or equations. Today from modern physics we know that quantitative data of the dynamic structure of the atom bring about qualitative results, establishing in principle a one-to-one correspondence between the quantitative and qualitative.

We must stress that the article of Dr. Langmuir deals with two entirely different worlds, the physico-mathematical world of exact sciences, where the aristotelian principles do not apply fundamentally; and the human world, still ruled by antiquated aristotelian methods, which are in the main responsible for the present-day tragedies and confusion.

It is not enough to contemplate the limitations of the methods of exact sciences. Our work is introductory to that new world in which physico-mathematical methods can be generalized to human problems, where those limitations will be non-existent.]

UP TO the beginning of the present century one of the main goals of science was to discover natural laws. This was usually accomplished by making ex-

periments under carefully controlled conditions and observing the results. Most experiments when repeated under identical conditions gave the same results.

The scientist, through his own experiments, or from previous knowledge based on the work of others, usually developed some theory or explanation of the results of his experiments. In the beginning this might be a mere guess or hypothesis which he would proceed to test by new types of experiments. If a satisfactory theory is obtained which seems in accord with all the data and with other known facts, the solution or goal of the investigation was considered to have been reached.

A satisfactory theory should make possible the prediction of new relationships or the forecasting of the results of new experiments under different conditions. The usefulness of the theory lies just in its ability to predict the results of future experiments. The extraordinary accomplishments of the great mathematical physicists in applying Newton's laws to the motions of the heavenly bodies gave scientists of more than a century ago the conviction that all natural phenomena were determined by accurate relations between cause and effect. If the positions, the velocities and the masses of the heavenly bodies were given it was possible to predict with nearly unlimited accuracy the position of the bodies at any future time. The idea of causation, or a necessary relation of cause and effect, has long been embedded in the minds of men. The recognized responsibility of the criminal for his acts, the belief of the value of education, and thousands of words in our language all show how implicitly we believe in cause and effect. The teachings of classical science, that is, the science up to 1900, all seem to reinforce this idea of causation for all phenomena.

Philosophers, considering many fields other than science, were divided in their opinions. Many went so far as to believe that everything was absolutely fixed by the initial conditions of the universe and that free will or choice was impossible. Others thought that cause and effect relations were mere illusions.

From the viewpoint of the early classical scientist, the proper field for science was unlimited. Given sufficient knowledge, all natural phenomena, even human affairs, could be predicted with certainty. Ampère, for example, stated that if he were given the positions and velocities of all the atoms in the universe it should be possible theoretically to determine the whole future history of the universe. Practically, of course, such predictions would be impossible because we could never hope to get the necessary knowledge nor the time to carry out such elaborate calculations.

A little later scientists developed the kinetic theory of gases according to which the molecules of a gas are moving with high velocity and are continually colliding with one another. They found that the behavior of gases could be understood only by considering the average motions of the individual molecules. The particular motion of a single molecule was of practically no importance. They were thus taught the value of statistical methods, like those which insurance companies now use to calculate the probable number of its policy holders that will die within a year.

The theories of explanations which were developed in connection with the natural laws usually involved a description in terms of some kind of a model. In general, instead of thinking of the whole complex world we select only a few elements which we think to be important and concentrate our minds on

these. Thus, the chemist developed the atomic theory according to which matter was made up of atoms of as many different kinds as there are chemical elements. These were thought of as small spheres, but no thought was given as to the material of which they were made. When later theories indicated that these atoms were built up of electrons and positive nuclei this made very little difference to the chemist, for he had not needed previously to consider that aspect of the model.

Material Unimportant

High school boys today are asked to build model airplanes. These must be of such shape that the different types of airplanes can be recognized when the profiles of the models are seen against a white background. It naturally is not particularly important just what kind of material is used in constructing them. Airplane designers build model airplanes to be studied in wind tunnels but these do not need to be provided with motors.

Most of the models which the scientist uses are purely mental models. Thus, when Maxwell developed the electromagnetic theory by which he explained the properties of light he thought of a medium through which these waves traveled. This was called the ether. It was supposed to have properties like those of elastic solid bodies. The reason for this choice of a model was that at that time the average scientist had been taught in great detail the theory of elasticity of solid bodies. Thus the magnetic and electric fields could be understood in terms of the familiar elastic properties. At the present time relatively few students are well trained in the theories of elasticity. The situation is thus reversed and today we explain the properties of elastic solids in terms of the electrical forces acting between their atoms.

Every student of geometry constructs a mental model when he thinks of a triangle. The mathematical lines that bound the triangle are supposed to have no thickness. In other words, they are stripped of any properties except those that we wish particularly to consider.

Equation Is a Model

Most of the laws of physics are stated in mathematical terms, but a mathematical equation itself is a kind of model. We establish or assume some correspondence between things that we measure and the symbols that are used in an equation, and then, after solving the equation so as to obtain a new relation, we see if we can establish a similar correspondence between the new relation and the data obtained from an experiment. If we succeed in this we have demonstrated the power of the mathematical equation to predict events.

The essential characteristic of a model is that it shall resemble in certain desired features the situation that we are considering. On this basis we should recognize that practically any theory has many arbitrary features and has limitations and restrictions imposed by the simplifications that we have made in the development of the theory, or the construction of our model.

Beginning with Einstein's relativity theory and Planck's quantum theory, a revolution in physical thought has swept through science. Perhaps the most important aspect of this is that the scientist has ceased to believe that words or concepts can have any absolute meaning. He is not often concerned with questions of existence, he does not know what is the meaning of the question, 'does an

atom really exist?' The definition of atom is only partly given in the dictionary. Its real meaning lies in the sum total of knowledge on this subject among scientists who have specialized in this field. No one has been authorized to make an exact definition. Furthermore, we cannot be sure just what we mean even by the word exist. Such questions are largely metaphysical and in general do not interest the modern scientist. Bridgman has pointed out that all concepts in science have value only insofar as they can be described in terms of operations or specifications. Thus, it doesn't mean much to talk about length or time unless we agree upon the methods by which we are to measure length and time.

For many years, up to about 1930, the new physics based on the quantum theory seemed to be fundamentally irreconcilable with the classical physics of the previous century. Through the more recent development of the uncertainty principle, developed by Bohr and Heisenberg, this conflict has now disappeared. According to this principle it is fundamentally impossible to measure accurately both the velocity and the position of any single elementary particle. It would be possible to measure one of the other accurately but not both simultaneously. Thus it becomes impossible to predict with certainty the movement of a single particle. Therefore, Ampère's estimate of the scope of science has lost its basis.

Probability Fundamental Factor

According to the uncertainty principle which is now thoroughly well established, the most that can be said about the future notion of any single atom or electron is that it has a definite probability of acting in any given way. Probability thus becomes a fundamental factor in every elementary process. By changing the conditions of the environment of a given atom, as for example, by changing the force acting on it, we can change these probabilities. In many cases the probability can be made so great that a given result will be almost certain. But in many important cases the uncertainty becomes the dominating feature just as it is in the tossing of a coin.

The net result of the modern principles of physics has been to wipe out almost completely the dogma of causation.

How is it then that classical physics has led to such definite, clean-cut laws? The simplest answer is that the classical physicist naturally chose as the subjects for his studies those fields which promised greatest success. The aim of the scientist in general was to discover natural laws. He therefore carried on his experiments in such a way as to find the natural laws, for that is what he was looking for. He was best able to accomplish this by working with phenomena which depended upon the behavior of enormous numbers of atoms rather than upon individual atoms. In this way the effects produced by individual atoms averaged out and became imperceptible. We have many familiar examples of this effect of averaging: the deaths of individual human beings cannot usually be predicted, but the average death rate in any age group is found to come close to expectation.

Atom Is Unpredictable

Since the discovery of the electron and the quantum and methods of detecting or even counting individual atoms, it has been possible for scientists to undertake investigations of the behavior of single atoms. Here they have found unmistakable experimental evidence that these phenomena depend upon the laws of probability and that they are just as unpredictable in detail as the next throw

of a coin. If, however, we were dealing with large numbers of such atoms the behavior of the whole group would be definitely determined by the probability of the individual occurrence and therefore would appear to be governed by laws of cause and effect.

Just as there are two types of physics, classical physics and quantum physics which have for nearly 25 years seemed irreconcilable, just so must we recognize two types of natural phenomena. First, those in which the behavior of the system can be determined from the average behavior of its component parts and second, those in which a single discontinuous event (which may depend upon a single quantum charge) becomes magnified in its effects so that the behavior of the whole aggregate does depend upon something that started from a small beginning. The first class of phenomena I want to call convergent phenomena, because all the fluctuating details of the individual atoms average out giving a result that converges to a definite state. The second class we may call divergent phenomena, where from a small beginning increasingly large effects are produced. In general then we may say that classical physics applies satisfactorily to convergent phenomena and that they conform well to the older ideas of cause and effect. The divergent phenomena, on the other hand, can best be understood on the basis of quantum theory of modern physics.

Let me give some illustrations of divergent phenomena. The wonderful cloud chamber experiments of C. T. R. Wilson show that a single high speed electron, or an alpha particle from an atom of radium, in passing through a gas leaves a trail of ions. By having moisture in the gas and by causing the gas to expand just after these ions are produced, drops of water are made to condense on the ions. By a strong illumination it thus becomes possible to see or photograph this track of ions as a white line on a dark background. The time at which an alpha particle will be emitted from a radium atom is inherently unpredictable. It would be totally contrary to the teachings of modern physics to suppose that our inability to predict such an event is merely due to our ignorance of the conditions surrounding the particular atom. The uncertainty principle requires that even if these conditions were absolutely fixed the time of emission and the direction of emission of the alpha particle are subject to the laws of chance and thus for a single particle are unpredictable.

May Alter History

The occurrences in the Wilson cloud chamber following the disintegration of a single radium atom are typical divergent phenomena. The single quantum event led to the production of countless thousands of water droplets and these made the track of the alpha particle visible and led to its reproduction in a photograph. This track may show some unusual feature of particular interest to the scientist. For example, it may have a kink which indicates that the alpha particle collided with the nucleus in one of the molecules of gas. The photograph may therefore be published—may start discussions among scientists that involve thousands of man hours—may delay one of them so that he misses a train on which he might otherwise have suffered a fatal accident. Examples of this kind, any number of which could be given, show that it is possible for single unpredictable quantum events to alter the course of human history.

The formation of crystals on cooling

a liquid involves the formation of nuclei or crystallization centers that must originate from discrete, atomic phenomena. The spontaneous formation of these nuclei often depend upon chance.

At a camp at Lake George, in winter, I have often found that a pail of water is unfrozen in the morning after being in a room far below freezing but it suddenly turns to slush upon being lifted from the floor.

Glycerine is commonly known as a viscous liquid, even at low temperatures. Yet if crystals are once formed they melt only at 64 degrees F. If a minute crystal of this kind is introduced into pure glycerine at temperatures below 64 degrees the entire liquid gradually solidifies.

During a whole winter in Schenectady I left several small bottles of glycerine outdoors and I kept the lower ends of test tubes containing glycerine in liquid air for days but in no case did crystals form.

My brother, A. C. Langmuir, visited a glycerine refinery in Canada which had operated for many years without ever having any experience with crystalline glycerine. But suddenly one winter, without exceptionally low temperatures, the pipes carrying the glycerine from one piece of apparatus to another froze up. The whole plant and even the dust on the ground became contaminated with nuclei and although any part of the plant could be temporarily freed from crystals by heating above 64 degrees it was found that whenever the temperature anywhere fell below 64 degrees crystals would begin forming. The whole plant had to be shut down for months until outdoor temperatures rose above 64 degrees.

Here we have an example of an inherently unpredictable divergent phenomenon that profoundly affected human lives.

Every thunderstorm or tornado must start from a small beginning and at least the details of the irregular courses of such storms across the country would be modified by a single quantum phenomenon that acted during the initial stages. Yet small details such as the place where lightning strikes or damage occurs from a tornado may be important to a human being.

Heredity and Evolution

Still more obvious examples of divergent phenomena which affect human life are those involved in the mechanism of heredity and the origin of species. Whether the genes are inherited from the mother or from the father seems to be fundamentally a matter of chance, undoubtedly involving changes in single atoms. It is known definitely that changes in genes or mutations can be produced by X-rays and it has even been proved that a single quantum is sufficient to bring about such an alteration. The growth of any animal from a single cell is a typical illustration of a divergent phenomenon. The origins of species and all evolutionary processes involving as they do natural selection acting upon mutations, must depend at almost every stage upon phenomena which originate in single atoms.

An idea that develops in a human brain seems to have all the characteristics of divergent phenomena. All through our lives we are confronted with situations where we must make a choice and this choice may sometimes alter the whole future course of our lives.

Will Affect Thought

As the implications of the uncertainty principle, especially as applied to divergent phenomena, are more generally recognized the limitation of the idea of causality should have profound effects

on our habits of thought. The science of logic itself is involved in these changes. Two of the fundamental postulates of logic are known as the law of uniformity of nature, and the law of the excluded middle. The first of these laws is equivalent to the postulate of causality in nature. The second law is simply the familiar postulate that a given proposition must be either true or false. In the past these so-called laws have formed the basis of much of our reasoning. It seems to me, however, that they play no important part in the progress of modern science. The cause and effect postulate is only applicable to convergent phenomena. The second postulate in assuming that any proposition must be true or false implies that we attach absolute meanings to words or concepts. If concepts have meanings only in terms of the operations used to define them we can see that they are necessarily fuzzy. Take for example this statement, 'atoms are indestructible.' Is this true or false? The answer depends upon what aspect of atoms is considered. To the chemist the statement is as true as it ever was. But a physicist, studying radioactive changes, recognizes that some atoms undergo spontaneous disintegration or destruction. The fact is that the chemist and the physicist have no exact definitions of the word atom and they also do not know in any absolute sense what they mean by indestructible.

Fortunately such questions no longer occupy much of the time of scientists, who are usually concerned with more concrete problems which they are endeavoring to treat in common sense ways.

It is often thought by the layman, and many of those who are working in so-called social sciences, that the field of science should be unlimited. That reason should take the place of intuition, that realism should replace emotions and that morality is of value only so far as it can be justified by analytical reasoning.

Human affairs are characterized by a complexity of a far higher order than that encountered ordinarily in the field of science.

To avoid alternating periods of depression and prosperity economists propose to change our laws. They reason that such a change would eliminate the cause of the depressions. They endeavor to develop a science of economics by which sound solutions to such problems can be reached.

I believe the field of application of science in such problems is extremely limited. A scientist has to define his problem and usually has to bring about simplified conditions for his experiments which exclude undesired factors. So the economist has to invent an 'economic man' who always does the thing expected of him. No two economists would agree exactly upon the characteristics of this hypothetical man and any conclusions drawn as to his behavior are of doubtful application to actual cases involving human beings. There is no logical scientific method for determining just how one can formulate such a problem or what factors one must exclude. It really comes down to a matter of common sense or good judgment. All too often wishful thinking determines the formulation of the problem. Thus, even if scientifically logical processes are applied to the problem the results may have no greater validity than that of the good or bad judgment involved in the original assumptions.

May Have Vital Importance

When we consider the nature of human affairs it is to me obvious that divergent phenomena frequently play a role of vital importance. It is true that

some of our historians cynically taught most of our college students from 1925 to 1938 that wars, the rise and fall of nations, etc. were determined by nearly cosmic causes. They tried to show that economic pressure, and power politics on the part of England or France, etc. would have brought the same result whether or not Kaiser Wilhelm or Hitler or any other individual or group of individuals had or had not acted the way they did. Germany, facing the world in a realistic way, was proved, almost scientifically to be justified in using ruthless methods—because of the energy and other characteristics of the German people they would necessarily acquire and should acquire a place in the sun greater than that of England, which was already inevitably on the downward path.

I can see no justification whatever for such teaching that science proves that general causes (convergent phenomena) dominate in human affairs over the results of individual action (divergent phenomena). It is true that it is not possible to prove one way or the other that human affairs are determined primarily by convergent phenomena. The very existence of divergent phenomena almost precludes the possibility of such proof.

The mistaken overemphasis on convergent phenomena in human affairs, and the reliance on so-called scientific methods, has been responsible in large degree for much of the cynicism of the last few decades.

The philosophy which seems to have made the German people such willing aggressors is allegedly based upon scientific realism. Almost any system of morality or immorality could receive support from the writings of Nietzsche, so inconsistent are they with one another. But his teachings, which purport to be based on the laws of natural selection, have led in Germany to a glorification of brute strength, with elimination of sympathy, love, toleration and all existing altruistic emotions.

Darwin, himself, however, recognized that the higher social, moral and spiritual developments of mankind were factors which aided in survival. Natural selection is often referred to loosely as the law of the survival of the fittest. The concept of fitness, seems, however, inherently rather fuzzy. Apparently these individuals are fittest which possess characteristics that increase the probability that they shall survive.

Rea lists' Arguments

We often hear realists deplore the effects of charity which tend to keep the unfit alive. We are even told that the whole course of evolution may be revised in this way. Similar arguments could be used against the surgeon who removes an appendix or a doctor who uses a sulfa drug to cure pneumonia.

But what is the need of developing a race immune to appendicitis or pneumonia if we possess means for preventing their ill effects. The characteristics that determine fitness merely change from those of immunity to those which determine whether a race is able to provide good medical treatment.

The coming victory of the United Nations will prove that survival of the nation may be prevented by an aggressive spirit, by a desire to conquer or enslave the world, or by intolerance, ruthlessness and cruelty. In fact there is no scientific reason why decency and morality may not prove to be vastly more important factors in survival than brutal strength.

Must Plan for Future

In spite of the fact that we can no longer justify a belief in absolute causation and must recognize the great importance of divergent phenomena in human life we still have to deal with causes and effects. After all we must plan for the future. We can do this, however, by estimating probabilities even where we do not believe that definite results will inevitably follow. When our Army lands in North Africa its probable success depends on the carefulness of the preparations and the quality of the strategy. But no amount of foresight can render success absolutely certain.

It does not seem to me that we need be discouraged if science is not capable of solving all problems even in the distant future. I see no objection to recognizing that the field of science is limited.

In the complicated situations of life we have to solve numerous problems and make many decisions. It is absurd to think that reason should be our guide in all cases. Reason is too slow and too difficult. We often do not have the necessary data. Or we cannot simplify our problem sufficiently to apply the methods of reasoning. What then must we do? Why not do what the human race always has done—use the abilities we have—use common sense, judgment and experience. We often underrate the importance of intuition.

In almost every scientific problem which I have succeeded in solving, even those that have involved days or months of work, the final solution has come to my mind in a fraction of a second by a process which is not consciously one of reasoning. Such intuitive ideas are often wrong. The good must be weeded out from the bad—sometimes by reasoning. The power of the human mind is far more remarkable than one ordinarily thinks. We can often size up a situation, or judge the character of a man by the expression of his face or by his acts in a way that would be quite impossible to describe in words.

People differ greatly in their ability to reach correct conclusions by such methods. Our superstitions and the present popularity of astrology prove how often our minds make blunders. Since we have to live with our minds, however, we should train them, develop them, censor them—but let us not restrict them by trying to regulate our lives solely by science or by reason.

Our morality is a kind of summation of the wisdom and experience of our race. It comes to us largely through tradition or religion. Some people justify evil things on the basis of morality—but by and large a recognition of right and wrong, even if these concepts are sometimes fuzzy, has proved to be of incalculable value to mankind. The philosophical, metaphysical or even scientific analysis of the principles of ethics has not proved particularly fruitful. A sense of morality and decency, although not scientific, may be a major factor in winning the war.

In my opinion the answer to this question is briefly, this:—As far as the laws of mathematics refer to reality, they are not certain; and as far as they are certain, they do not refer to reality.

A. EINSTEIN, *Sidelights on Relativity*

✯ BOOK REVIEWS ✯

A Scientific Humanist

SCIENCE AND CRITICISM: THE HUMANISTIC TRADITION IN CONTEMPORARY THOUGHT, by Herbert J. Muller. New Haven: Yale University Press, 1943. $3.75.

The profession of literary scholarship in which I was trained is, on the whole, not only shockingly ignorant of science but stubbornly devoted to talking about the 'higher values' of literature without bothering to specify, except in moralistic or metaphysical terms what is meant by 'higher.' The customary apologetics that purport to explain the relationship of literature to other human activities all too frequently reiterate charges against 'scientific materialism' that might have been true a hundred years ago, but are no longer true today. (When literary scholars talk about science they are usually thinking of a freshman chemistry course they once were compelled to take decades ago.) Literature, they say in a hundred different ways, is above 'mere' practicality —and in so saying, they only strengthen Veblen's sarcastic charge that the attitudes of scholars in *litterae humaniores* are chiefly determined by snob values of the leisure class. Literary scholars, and even literary critics, are usually unable to state the case for literature except in sentimental, dogmatic, or transcendental terms.

On the other hand, it is the contention of some literary scholars, unfortunately still a small minority, that both literary theory and the public understanding of literature will be immeasurably strengthened when literary scholars cease sniping at science and 'materialism' and begin to learn what science can offer that can help us to understand the functions of literature. In *Science and Criticism* Professor Herbert J. Muller of the English department of Purdue University, has placed himself in the vanguard of that minority. His book, therefore, is one of great importance, not only to literary theorists, but also to all readers who, tired both of academic dogmatisms and of women's club sentimentalities about the relationship of literature to life, want a statement on the subject that a tough-minded empiricist can treat seriously.

The finest thing in Professor Muller's book is his survey of a dozen or more fields of modern and speculative science in the light of the question, 'What is there here that a literary critic ought to know? What does this scientist say that illuminates the works of literature or the controversies of critics?' To perform such a task obviously one needs to know not only a great deal about literature and literary criticism, but also a great deal about science. His knowledge of literature is, of course, extremely competent; his knowledge of science is likewise impressive. Many scientists know a great deal more about specific fields than Professor Muller, but only a few of the very best scientists, I am sure, have so clear a grasp of science as a whole, including its moral, philosophical, and humanistic implications. The intelligent general reader, curious to know what post Einsteinian physics, modern psychoanalytic theories,

the non-aristotelian system of Korzybski, the biological theories of Trigant Burrow, the physiological psychology of Burridge, the theories of the Gestaltists such as Lewin and Koffka, the findings of modern anthropology and all the other exciting new fields of science mean to us as moral and purposive beings, will find in Professor Muller's book an intelligible and indispensable guide.

In evaluating the moral implications of science, he first calls attention to scientific activity itself as a moral example: 'In no other human activity is a higher premium placed upon truthfulness, or is the ideal of truthfulness more fully realized. . . . Outside his profession, needless to add, the scientist is no paragon of selfless virtue and wisdom. . . Yet the scientific community as a whole is the most impressive example history has yet known of a disinterested, coöperative enterprise, international in scope, directed toward impersonal ends and by impersonal standards. It is the most impressive demonstration of the actual possibility of "supra-personal, supra-partisan, supra-racial standards and values." '

In reviewing modern biology, which no less than other sciences has rid itself of the cruder dogmatisms of an earlier day, Professor Muller emphasizes the conclusion arrived at by such leaders as W. C. Allee that ideals of altruism and human solidarity, far from being sentimental nonsense, are grounded in biological necessity. Coming to psychology, he shows how the theories of the Gestalt school give promise of scientific contributions to esthetics that, unlike the explanations of narrowly mechanical psychologies, estheticians themselves may welcome without sacrifice of their faith in intuitive artistic perception and enjoyment. In a section entitled 'Literary Criticism in the World of Einstein,' he shows how modern science, while able neither to 'identify values with any essential, ultimate reality,' nor to 'make them inhere in anything but human experience on this earth,' nevertheless has 'removed the grounds for disparaging them as subjective and therefore illusory.' The 'innate moral sense,' which for centuries has been given a supernatural explanation, and its modern counterpart, 'the inner check,' which Paul Elmer More and Irving Babbitt also found impossible to be accounted for in naturalistic terms, is being accounted for by modern physiologists, such as Judson Herrick, who 'conceive intelligence, abstraction, idealization, and all these "higher" activities as part of the biological mechanism of control; if they do not completely explain this mechanism, at least they do not make a needless mystery of it or split us in two.'

Muller is not uncritical of scientists by any means. Many scientists, especially technologists, are just as closely imprisoned in the matter-mind dichotomy and the two-valued causality of nineteenth century 'materialism' as are the Norman Foersters and the Mortimer Adlers. Muller knows that science-as-dogma is as dangerous (and shallow) as metaphysics-as-dogma. But he repeatedly stresses the important point, that modern science, which has begun the scientific analysis of scientific activity itself and has ruthlessly analyzed its assumptions and so has become aware of the character of its own conclusions, does not remotely resemble the rigid body of mechanical dogma that old style humanists generally have in mind when they are attacking 'science.'

Professor Muller's statement of the aims of general semantics is brief, but excellent. He is not uncritical of Alfred Korzybski and finds in *Science and Sanity*, among other things, too sharp a dif-

ferentiation made between men and animals, insufficient attention paid to 'primary biological drives,' traces of 'rationalistic excess' that result in a tendency to 'tolerate' rather than understand poetic and artistic processes. Nevertheless, his objections are tempered by his full recognition of the fact that general semantics is an open system, 'consciously dated Science 1933,' and therefore inviting addition, modification, qualification, and further development.

'Science, the author of our world,' says Professor Muller, 'is still a stranger here itself.' It need not be. I personally wish that every philosopher, preacher, teacher, literary critic, and moralist would read this book. It would dispel at once a great deal of pessimistic nonsense about the 'moral bankruptcy' of the modern world. Scientific and humane values are complementary to each other, as Professor Muller says, not opposed: 'Literary men who oppose the "merely" practical values of science to spiritual values have essentially the same attitude as ladies who just love culture. All savage societies had spiritual values; but there has been and can be no civilization without at least the rudiments of science.'

On the other hand, 'The very triumphs of science only accentuate the further need of literature. . . . With its immense intricacy, modern society is obviously dependent upon the efficient system of communications that science provides. With its immense heterogeneity, it also has especial need of an art of communication, a full and moving expression of the common meanings that hold a society together; and literature can not only realize the real but socialize it, effect not only communication but communion. . . . And here the extremely difficult problems forced on literature are also the great opportunity for literature. It can assimilate the meanings that science merely formulates, fuse them with older and deeper meanings, naturalize and humanize them. It can lead from a logical consistency to a vital coherence, from a logical synthesis to a vital harmony. It can help men really to own the world created by science.'

This will appear to be too ambitious a claim for literature and the arts only to those who are unable to accept Kenneth Burke's statement that art is 'a remarkably complete kind of biological adaptation.' Muller with Burke, regards art as 'a consummation of the processes of adaptation by which living organisms seek constantly to maintain their integrity and equilibrium amid the stress of constant flux and change.' The art-for-art's-sake boys and those who talk (as Allen Tate does) of the 'radical discontinuity' between the 'physical' and the 'spiritual' realms will deplore Professor Muller's conclusions, of course. They always see red at any talk about 'adjustment' or 'adaptation' anyway. But the art-as-adaptation theory (and here one would like to add, with Korzybski, 'for a symbolic class of life') is the only modern statement of the *raisons d'être* of the artist's activity that, strictly speaking, makes sense. The devotees of beautiful letters had therefore better get used to it.

S. I. HAYAKAWA

Educators Castigated

WAR AND EDUCATION, by Porter Sargent. Boston: Porter Sargent, 1943.

This important book deals with those problems of human maladjustments which stem from our unrealistic educational methods. One of the reasons for the present conflict, Mr. Sargent writes, is the fact that our 'thoughtways' and our institutions, particularly our schools and colleges, are not adjusted to modern tech-

nological advances. Living in a world which has developed a new way to master the resources and energies about us, utilizing power which is 'thousands of times greater than that even the greatest armies would have exerted of old,' we adhere to educational methods which go back to the middle ages, political ideals which belong to 'a time preceding the horse and buggy,' and ethical precepts which are thousands of years old.

Instead of being apprised of 'the wide and growing field of human knowledge, of the wonderful world in which he lives, of the gradually dissolving mysteries of the past, of the joy of taking apart abstractions, of seeing thorough slogans and symbols,' the average student has 'been kept traveling round the dusty course . . . properly called the curriculum.' He has learned very little about his subjects, as tests given by 'hundreds of conscientious investigators' readily show, and nothing at all about social processes, about getting along with his fellowmen. The result, of course, is a steady march of thousands of young people into a world they have not been prepared to enter.

Many—if not most—of our educators, rather than advocate courageous intellectual advances corresponding to technological changes, either advise retreat 'toward security and safety . . . to Monte Cassino' and St. Thomas Aquinas, or, becoming mental sybarites, find 'pleasure in exploring and questing among the convolutions of their own cerebra.' Others, such as the neo-humanists, mumbling about absolutes and eternal verities, look out, 'through the eyes of a parasitic Athenian like Plato upon a world such as Plato could not imagine.' They in nowise help their students or themselves become adjusted to this industrialized and mechanized world.

Educators do not teach an 'understanding of human behavior'; they teach 'subjects.' Mathematics, language, the classics are taught in a vacuum as if they had no relation to each other or to anything outside the classroom. It is the unusual student who even thinks of applying to life such knowledge as he may have obtained (and remembered) in high school and college. Mr. Sargent believes that not until the artificial departmental system is eradicated, 'the partitions between these fragments of knowledge . . . broken down,' and 'isolated observations . . . correlated' and interpreted, will knowledge 'serve its greatest purpose.'

The products of contemporary scholarship are 'Minds filled with unrelated facts and still untrained in habits of correlation and interpretation.' They are 'seedbeds for propaganda:' Such minds, because of their habitual isolation from the gradations of light and shade which life constantly presents, 'see only black and white, good and bad.'

Although most educators are divorced from reality (they 'continue to spin cobwebs within their skulls without intimate knowledge of the outer world'), and although they bring only confusion to their students, they are not aware of certain defects within their system of education. They even offer remedies to correct conditions. Unfortunately, these remedies are as unrealistic as their present system. In the chapter on 'Ideals without Vision,' Sargent writes: 'Educational journals . . . are filled with . . . trite, rhetorical repetition about idealistic purposes. Most of the objectives set up are artificial, meaningless, a screen to hide the emptiness of what's behind. They give evidence of the fuzzy minded confused thinking of committees or commissions which carry exalted names. . . Sounding through these abstractions, one must conclude that American educators

lack clearly defined objectives.' It is at once apparent that one of the greatest faults of educators, past and present, is that they stress, not the knowledge of the world about us, but words. 'Into what quagmires we have floundered through this neglect of reality and the obsession with symbols tossed back and forth,' Sargent says, 'has only recently been revealed by the development of the study of general semantics.'

What can we do to change this intolerable situation? Mr. Sargent doesn't know all the answers; he frankly admits that much of his criticism is not 'constructive.' But he does offer some suggestions for making education mean more in the future.

What suggestions Mr. Sargent makes are all in the direction of extensionalization. Educators must employ the 'scientific method,' borrowed from our artisans and craftsmen, so that their students' horizons may be widened, just as, by its use elsewhere, their standard of living has been raised. They must abolish gerontocracy, or the rule of the aged. They must do away with present methods of selecting students for college. They must cease sterile scholarship and eradicate the departmental system. And above all, they must encourage their students to travel, observing other peoples, other customs, until they grow in understanding (as Porter Sargent himself did; as, more recently, Wendell Willkie did). Then a beginning, at least, will have been made for the cessation of hate.

HENRY J. WEBB

Suggestion for Salvation

PATHS OF LIFE, by Charles W. Morris. New York: Harper & Brothers, 1942. $3.

Charles W. Morris, with Dewey, considers the individual as a system of interrelated interests. The term *interest* symbolizes a highly complex activity which mediates a need and an end-in-view. The word interest, then, describes directed *activity* in anticipation of consequences which, as a foreseen end, enter into the very makeup of the need. The system of interests is, of course, not a smooth system. There is contradiction and conflict. Any system is, in a sense, a hierarchy, with heads and subheads. The stronger interests dominate the weaker. Though every individual is unique in the quality, the range, and the diversity of his interests, Morris presents evidence that throughout the ages men have employed common means in order to satisfy their needs — whatever they have been. All men, he says, have satisfied their needs by using three major components of personality.

They are called by Morris, suggestively, the *dionysian,* the *promethean,* and the *buddhistic* components. The dionysian component of personality is that which permits of release and indulgence of biological and social desires through easy concourse with the resources available in the world.

But the world doesn't always hold, as easily available, the means of satisfaction demanded by the individual. Frequently he must make or remake for himself such means of satisfaction. The sum of the activity in which he engages in making and remaking the world in order to satisfy his needs he calls the promethean component of personality.

But even with all the power at his command, the human being cannot always take, make, or hold the objects necessary to satisfy his needs. Another compromise must be effected. The individual must then curtail his needs as the only alternative to the frustration of unsatisfied desires. This is the buddhistic component of personality which tends to-

ward solitude, toward self-effacement, and detachment.

Morris stresses the point that each individual is a unique combination of these components. He declares that it is possible to classify individuals on the basis of the relative strength of these components in their personalities. Different individuals are 'dionysian,' 'promethean,' and 'buddhistic' to different degrees. Persons who have the same relative order of strengths of these personality components belong to the same type. For example, those whose components are (in strength) predominantly buddhistic, moderately promethean, and mildly dionysian are people who can exert a high degree of self-control, who are active and energetic, and who are able to resist the call of the wild. Such people Morris classifies as 'buddhistic' to characterize this combination of factors in terms of relative strength. Individuals may also be 'dionysian' or 'promethean,' and, depending on the relative strength of these components, 'apollonian,' 'Christian,' or 'Mohammedan.' Societies, like individuals, can be classified according to the personality type most encouraged in a given culture.

It is interesting to note that W. H. Sheldon of Harvard (in collaboration with S. S. Stevens) has written a book, *The Varieties of Temperament,* which gives a scientific account of the three primary components of personality as discussed by Morris. Although Morris had conferred with Sheldon, each had worked independently. Even before the publication of both books it became apparent that their results would dovetail, although their researches were made in different fields.

It is Morris's contention that each type has expressed itself in a peculiarly characteristic way of life—a different philosophy, different form of art, different variety of religion, etc. Each type has, in short, a different 'path of life.'

Given the three basic components, Morris asks: Where do we—Americans—now stand? Individually and collectively we exhibit highly developed promethean traits. Are these sufficient to our goals, or needs? Where may we, if we would, go from here? There never yet has been a society which has reared children to develop consciously a composite personality which gives equal importance to *all three* basic components. Will such a society, presently, come forward—in us? Morris asks.

Morris says that a balance, a levelling off, of the three components would make the ideal human being—the ideal human type—around which to build a philosophy, a religion, a new way of life, a new world. And why not? Such a type would feel the rush of creative impulse and would have the courage to bear it; would temper it with self-denying foresight, with cool and thoughtful consideration for others; would have the skill and the force to make the vision real. Such a type would integrate all of the forces with which men are endowed. Contradiction? No. Not of the either-or kind. Synthesis, rather, of complementary and interactive forces which result in the richest and most human of human behavior. There is need for conscious as well as unconscious synthesis. There is imperative need for flexibility. But achieved, man reaches his full development.

If anyone has looked inside himself with perplexity and outside himself with misgivings, he will find in *Paths of Life* not only grounds for reassurance and hope but directives toward a better world.

BESS SONDEL

University of Chicago

✡ NEWS AND MISCELLANY ✡

Communication from Korzybski

Dear Hayakawa:

It may be of interest to the readers of *ETC.* to know that in the May, 1943, issue of the *American Journal of Psychiatry* appeared an article by Dr. W. Horsley Gantt on 'Measures of Susceptibility to Nervous Breakdown.' Dr. Gantt was a personal student of Professor Pavlov and is the Director of the Pavlovian Laboratory at the Phipps Psychiatric Clinic, Johns Hopkins University.

Dr. Gantt deals with experimental laboratory data in his work with dogs which have important implications for human psychiatry. In his article he shows that condition*al* reactions follow an exponential law expressed by the equation $cr = a + b\ (1 - e^{-cQ})$, while the un-condition*al* reactions follow a linear (additive) law: $UR = a + bQ$. These quantitative data so far apply to salivary secretions in dogs. This fundamental difference between conditional and un-conditional reactions is not changed on the human level when we deal with symbol reactions, which should be of maximum condition*ality* and animal (humanly unhealthy) signal reactions of a low degree of condition*ality*, except that the former would be represented by a still more complex exponential law.

When I wrote my paper for the Second American Congress on General Semantics entitled 'Some Non-aristotelian Data on Efficiency for Human Adjustment', unfortunately I did not know that Dr. Gantt had produced quantitative data on this general subject, which I would have included in my paper. In our work we have no doubt about the qualitative aspects of those different types of reactions, but Dr. Gantt seems to be the first to have shown that in a quantitative way. We should not disregard the fundamental difference in the degrees of conditionality between human and animal reactions, which involves the difference between non-additive and additive relations. It would be advisable that the readers of *ETC.* should consult the paper of Dr. Gantt.

Yours cordially,
ALFRED KORZYBSKI

Extensionality in Law

Professor Max Lerner's *The Mind and Faith of Justice Holmes* (Little, Brown and Company, Boston, 1943) is a brilliant interpretative selection from the judicial opinions, speeches, and essays of the greatest of modern jurists. What is impressive to the student of general semantics is Justice Holmes's persistent refusal to be trapped into the discussion of problems to which answers cannot be found, his insistence on the consideration of the totality of social context wherever possible, his keen insight into the limitations of formal logic, and his extensionality, which has been the inspiration of an entire school of contemporary 'legal realists.'

Holmes's ruthless destruction of legal metaphysics is illustrated by passages such as these: 'If you want to know the law and nothing else, you must look at it as a bad man, who cares only for

the material consequences which such knowledge enables him to predict, not as a good one, who finds his reasons for conduct, whether inside the law or outside of it, in the vaguer sanctions of conscience. The theoretical importance of this distinction is no less, if you would reason on your subject aright. The law is full of phraseology drawn from morals, and by the mere force of language continually invites us to pass from one domain to the other without perceiving it, as we are sure to do unless we have the boundary constantly before our minds. . . . Manifestly . . . nothing but confusion of thought can result from assuming that the rights of man in a moral sense are equally rights in the sense of the Constitution and the law. . . .

'But if we take the view of our friend the bad man we shall find that he does not care two straws for the axioms or deductions, but that he does want to know what the Massachusetts or English courts are likely to do in fact. I am much of this mind. The prophecies of what the courts will do in fact, and nothing more pretentious, are what I mean by the law.'

There are numberless passages in Oliver Wendell Holmes's decisions and essays, and many too in Professor Lerner's remarks prefatory to the several sections of the book, that are warming to a semanticist's heart.

Progress at Iowa

Professor Wendell Johnson's course, 'General Semantics,' will be offered again during the winter semester from January to April in the departments of Psychology and Speech at the University of Iowa. Introduced in 1939, it was the first course in general semantics to be offered in an American university. The enrollment has increased with each offering of the course, and last year, with the general university enrollment down considerably, forty-six students took the course, an increase of over thirty per cent from the previous year. In the *Papers from the Second American Congress of General Semantics,* Johnson describes the course in 'Experiences in Introducing a University Course in General Semantics.'

A series of three Ph.D. dissertations directed by Wendell Johnson at the University of Iowa are scheduled for publication as a special issue of *Psychological Monographs,* under the general title of 'Studies in Language Behavior.' An introductory article, entitled 'A Program of Research,' by Johnson will be included in the volume. The three research studies were done by Drs. Helen Fairbanks, Mary Mann and John Chotlos. The studies were concerned with quantitative approaches to the analysis of language behavior. Drs. Fairbanks and Mann investigated oral and written language obtained from schizophrenic patients and 'normal' university freshmen, while Dr. Chotlos worked with written language samples of Iowa school children. It is expected that the monograph will appear in from six to eight months.

Johnson reports that he is also nearing the completion of his forthcoming book on general semantics which will be published by Harper's. The book will apply general semantics to common problems of personality adjustment and to cultural factors involved in these problems. The textbook edition will probably be entitled *Clinical General Semantics.* Johnson credits Edwin Green with the best trade edition title so far suggested, *And So Forth.* If anyone can suggest a better title than that for the trade edition, Johnson will be very glad—and so forth.

Unity of Problems

The following memorandum, 'Preliminary Note on the Unity of Problems Through Method,' was prepared by M. Kendig for her students in a seminar on general semantics given during her stay at the University of Denver this past summer:

'The problems we face in making the war and winning the peace are only intensifications of our weaknesses, difficulties, inadequacies of orientation and evaluations in ordinary life. The problems of a physician, a teacher, a business man, a farmer, a mother, a statesmen, etc., are not unrelated. They are all of a piece methodologically. All are complex. They differ only in degrees of complexity, in the number and kind of seen and unseen factors that must be taken into account. Some which deal with the "tangible" and "seen" can be muddled through by so-called common sense without a sharp and conscious revision of method.

'That diverse problems have much in common is hardly a new observation. But we are not accustomed to thinking of this truism in terms of method. We are even less accustomed to realizing that it all comes down to how we use our nervous systems, how we evaluate, how we deal neuro-semantically and neuro-linguistically inside our skins with ourselves, with others, with the world.

'The way we "think" and "feel" and speak are to the "facts" as a map is to the territory it represents. "Facing facts" is a meaningless cliche unless we see it as a problem of making our maps fit the territory. This implies the need for a method of adjusting our learned definitions, generalizations, attitudes, and beliefs to fit the changing facts in the dynamic continuum of our experience. For example, the situation of today is not the situation of yesterday, or of 1920, 1890, or 1776, notwithstanding economic and political reactionaries to the contrary.

'The alternative to fitting our maps to the territories is "wishful thinking." This expression is merely an opprobrious epithet for opinions we dislike unless we visualize the mechanism of "wishful thinking," namely, the imposing of our map-definitions (learned as dogmas or over-generalized from experience) on the territory-facts *without* inspection of the present facts and appropriate revision of our generalizations to fit them. This in brief constitutes the intensional attitude and method in life. If we stick to intension, to our definitions, to our "wishful thinking," our maps are poor guides to the territory. Our ability to predict the outcome of events is low. We end up resentful, bewildered, and nervously disintegrated, or succumb to a deadening state of static adjustment to our maladjustment.

'When we "face facts" and fit our maps to the changing territory, we are in adjustment with the world at a date. With constant revision of our maps, we better control ourselves and the "facts." We do not fully impose our past experience on the present; we allow for new factors. We are not word-bound, definition-bound; we keep our spontaneity; we are free to act in ways that are appropriate to new circumstances. Adjustment becomes (as it should be) a dynamic process. We have some predictability in our affairs. There is a larger degree of probability that our plans, our blueprints of what we want, will work out to some satisfying approximation of the desired ends. This in brief constitutes the extensional attitude and method in life.

'We all use the extensional method some of the time. The problem is how to train ourselves and others to use it con-

sciously as an attitude and a method most of the time. Unless we concentrate on that as a major project in general mass education in the broadest sense, we shall remain unable to use our knowledge and our tremendous technological resources. Our plans at home and abroad will remain blueprints. They will turn out to be more maps of historic never-never lands, destined to be swallowed up in the "realities" of unpredicted and therefore uncontrolled events—much as they were after the last war.

'By method and by method alone can we make a direct attack on changing the neuro-social continuum of old habits, old institutions, old ways. The task before us is tremendous.

'The *Papers from the Second American Congress on General Semantics* just scratch the surface in indicating the possibilities. But essentially they do show us what can be done. They show that the extensional method of general semantics is generally teachable and workable, and that we can predict results in terms of more flexible personal and social adjustments, now and in the uncertain future.'

Reprints Available

According to the suggestion made by some of our readers, an excellent way of answering the question, 'Can you explain to me, in plain language, what general semantics is about?' is to hand the inquirer a copy of Edward Thorndike's article, 'Science and Values,' which was printed, with a foreword by Korzybski, in our last issue. Teachers especially have written in saying that they would like to have reprints for distribution, since the article proves to be an extremely efficient means of launching a discussion that leads directly into the subject-matter of general semantics.

Reprints of 'Science and Values' have therefore been made available. They are obtainable from *ETC.* at 25 cents a copy; 15 cents in lots of twenty or more. Reprints of Bloodstein's article on 'General Semantics and Modern Art' (with illustrations) are also available at the same price.

Institute Seminars

The Institute of General Semantics announces that the usual Holiday Intensive Seminar will be conducted by Alfred Korzybski from December 27 through January 2, 1944. Also a new type of special intensive seminar may be given this winter during two long week-ends for a limited number of professional persons if it is possible to find suitable dates.

THE 'IS' OF IDENTITY

The little word *is* has its tragedies; it marries and identifies different things with the greatest innocence; and yet no two are ever identical, and if therein lies the charm of wedding them and calling them one, therein too lies the danger. Whenever I use the word *is*, except in sheer tautology, I deeply misuse it; and when I discover my error, the world seems to fall asunder and the members of my family no longer know one another.

G. SANTAYANA, *Scepticism and Animal Faith*

✡ CORRESPONDENCE ✡

'Mother's Cooking Is Best!'

SIR: Apropos of Dr. Margaret Mead's remarks in her article 'The Problem of Changing Food Habits' in the first issue of *ETC.*, I wonder if the extent to which the food preferences of many Americans are tied up with 'mother love' has ever been noted in the literature on the subject? I have eaten with friends in restaurants who seem to experience considerable feelings of guilt about enjoying dishes more interesting or more elegant than their mothers would have (or could have) prepared. In the case of familiar dishes, it is only with great difficulty and fear of being 'disloyal to mother' that they can bring themselves to saying 'This chocolate cake is *better* than Mother used to make.' Indeed, I found difficulties in making such an admission myself during the first few months I lived away from home.

I feel certain that, in addition to other motivations, an unconscious insistence on 'remaining loyal to mother' is a factor in maintaining rigidity of food habits.

Chicago, Illinois ELINOR BISHOP

Psychiatric Casualties and the War

SIR: There is much being written concerning the psychiatric casualties resulting from the war. Articles in newspapers and magazines suggest that an alarming number of psychiatric casualties are occurring. *Army Medical Bulletin No. 66* (April, 1943) states that 'experience has shown that neuropsychiatric conditions account for a substantial proportion of casualties in the military service.' Much is also being written about a preventive program which has been set up by the Medical Department of the Army to screen out men who might possibly develop psychiatric disabilities under battle conditions. However, this screening process does not remove all those susceptible to psychiatric disabilities.

That general semantics has preventive and remedial possibilities for dealing with psychiatric casualties is unquestioned by those familiar with its formulations and methods. We who are interested in the 'mental' rehabilitation of battle casualties should consider the following propositions:

1. 'All' psychiatric casualties come an established methodology of psychotherapy and prevention.

2. General semantics is fast becoming an established methodology of psychotherapy and prevention.

I wish to propose, therefore, first, that all persons interested in the application of general semantics in the 'mental' rehabilitation of soldiers send to *ETC.* suggestions of what might be done, or actual case studies showing what has been done. These communications should be edited by a competent person, preferably a psychiatrist, and should be published (due credit being given to each contributor), perhaps as an article in *ETC.*

I further propose that a *remedial* general semantics, such as has been outlined by Dr. Wendell Johnson [in *Language and Speech Hygiene*, Institute of General Semantics, Chicago, 1939], be fully formulated and developed to take care of, in the years immediately after the war,

personal and social problems that will have resulted not from the war only, but also from the ensuing industrial upheaval and reconstruction.

The *Army Medical Bulletin No. 66* already mentioned is obtainable from The Book Shop, Medical Field Service, Carlisle Baracks, Pa., for twenty-five cents. I suggest that those who are interested in the application of general semantics in the rehabilitation of soldiers obtain a copy of this bulletin, which is a convenient brief compendium of neuropsychiatry in the Army.

SGT. ALVIN P. BRADFORD
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'Fundamentalism' vs. 'Modernism'

SIR: Two-valued orientation, failure to distinguish between levels of abstraction, name-calling, and a high degree of intensional orientation and attendant over-verbalization were vividly illustrated in a recent meeting of the congregation of a protestant church in Evanston. The occasion was the reading of a report prepared by a committee of eleven who had been appointed to recommend the selection of a new minister. After studying some forty or fifty applicants, the committee had selected a candidate. His background, record, finances, reputation, and other pertinent details had all been meticulously considered and seemed to point to a man of unusual merit.

When the report had been read, an elderly gentleman arose to say that the committee, of which he was a member, had not been unanimous in its decision, and that four members (of the eleven), had disapproved of the candidate on points of religious doctrine, explaining that 'whoever did not accept the Scriptures literally' was 'treading on dangerous ground.' However, he added that in the interest of unity he would be willing to second the motion that the report be accepted and voted upon.

This announcement led to an explosion of disagreement and debate. A member of the ruling body of the church declared that a number of persons, including himself, could not worship under a 'modernist.' Others arose to agree or disagree with this position. In no time battle lines were drawn up: 'fundamentalists' vs. 'modernists.'

Feelings ran high. Charges and counter-charges were made by each 'side' against the intentions and good faith of the other. It was clear from the statement made by one member of the committee that the candidate's alleged 'questionable views about the Bible and about Christ' had been *inferred* rather than clearly established, although the fact seems to have been noticed by few. A young lawyer got the floor and in a speech that ended at a high pitch of excitement charged the 'fundamentalist' minority with disrupting the proceedings on ridiculously unimportant grounds. He criticized the attitude which had been expressed that a minister who played golf or cards occasionally—as the word 'modernist' had meant to one man—was not the right man to have in the pulpit. He challenged everyone present to 'define' what was meant by 'modernism' and predicted that no two answers would be alike. He sat down amid much applause, as the chairman called out that there would be no demonstrations. Meanwhile, a woman got up intermittently to shout, 'Does he preach the Blood of the Lamb? Can anyone answer me that?' No one answered her question.

Another gentleman, a member of the congregation for over forty years, said he

was greatly saddened by the dispute. He quietly explained that the entire matter of 'fundamentalism' and 'modernism' had long ago been forgotten by the General Assembly as a dead issue, and that it was futile and dangerous to revive it. Unfortunately, no one paid any attention to him.

After about two hours of acrimonious debate, during which several persons left in protest at the conduct of the meeting, a vote was taken, as the result of which the candidate was approved, 134 to 26. A motion for a unanimous decision was made and voted upon, but the minority held fast.

Probably no one, regardless of what 'side' he was on, left the church that afternoon without feelings of regret and disappointment. Some are known to be considering transferring their membership to other churches. At least one elder has resigned. He could not listen, he explained, to sermons preached by a man who was a 'modernist' and who as such 'denied the divinity of Christ.'

Probably no other incident in the history of the congregation has been as shattering to its morale. Former friends have become estranged, many people have been disheartened and disillusioned, and the prestige of the church has been seriously damaged.

EDGELEY W. TODD

Evanston, Illinois

'Unions Are Bad!'

SIR: An interesting example of the way in which a tenaciously held dogma can prevent the verbal 'map' from being brought into correspondence with the 'territory' is provided by an experience I had with a Catholic priest in Denver. As an organizer for the C.I.O., I was in Denver settling a strike involving a group of workers of Mexican origin. The issues of the strike had become far greater than the original wages-and-hours demands of the workers. The entire Spanish-speaking community of Denver had identified itself with the strike, making it their fight for relief from hardship and prejudice. Because the community was predominantly Catholic, it was inevitable that Father X ——— take sides. He cast his lot (and that of his church) with the strikers.

The good Father entered the struggle with vigor. He accepted and fought for the program of the union without reservation. He held services on the picket-line each morning. He brought in more donations of food and funds to strike headquarters than anyone else. He visited strike-breakers in their homes trying to point out to them that strike-breaking was a betrayal of their own interests. He wrote and mimeographed handbills. He did everything possible to bring about a successful and speedy termination of the strike.

Yet, throughout the entire struggle—a struggle so intense that the entire city was aroused — Father X ——— clung firmly to his pre-strike conviction that unions were bad, strikes worse, and picket-lines unspeakably wicked. Of course, this particular union was all right, this particular strike was justified, and this particular picket-line was necessary to win. But no amount of reasoning or even active participation in the picket-line could shake his belief that this whole affair represented an 'exceptional case.'

EDWARD JOSEPH NIX, JR.

Illinois Institute of Technology
Architecture, '47

Bloodstein: Pro and Con

SIR: Oliver Bloodstein in his article 'General Semantics and Modern Art' (I,

12; August, 1943) plainly states in his first paragraph that 'the purpose of this paper is to deal with modern art as a non-aristotelian system.' This he has done most successfully — in fact my only dissent would be that he has proposed a problem and made the solution appear too easy. Modern art is not the compact neatly packaged article which Mr. Bloodstein claims it to be. It would almost seem as if he had set down certain arbitrary definitions of modern art in order to prove a point of semantics. In reality, the art of the past fifty to seventy-five years has shown more than the one direction which he seems to accept as its total contribution. Mr. Bloodstein's over-simplified and over-generalized approach to the vast body of his material defeats his otherwise lucid and highly valuable analysis.

To be more specific, my desire is not to argue with isolated statements in his paper, but rather to urge a fuller understanding of the rich and complicated material which he has handled with a too easy simplicity. When he says that 'modern art is based on consciousness of abstracting' I would agree completely, but I would insist that this statement is true of all good art, modern or otherwise. When he continues in his second point to say that 'modern art considers structure, relations, order to be the *only* content of art' I am forced to point out that all valuable modern art has not been essentially the restructuralizing of visual experience, as this statement would indicate. Granted that much of it has been, such as the work of Cézanne, Seurat, the Cubists, and the Constructivists, but what of the intense emotional content of Van Gogh, of Chagall, of Miro and Rouault? The truth is that throughout the long and complicated history of Western art two dominant but diametrically opposed trends have appeared simultaneously: the orderly cerebral school which sometimes is called Classicism and the personal emotional school better known as Romanticism. In the latter, structure and order are frequently sacrificed to deeply felt but not necessarily representational content. I am a little suspicious that Mr. Bloodstein soft-pedaled the important non-structural trends in modern art because they did not so readily prove happy playmates for General Semantics.

On one other point of fact I must take issue with Mr. Bloodstein. He states that prior to the modern period in art no painter had consciously concerned himself with the problem of three-dimensional organization on flat surface. A notable exception was the fabulous Peter Paul Rubens, whose paintings are famous not only for their lavish sensuality but also for their astute handling of moving forms in three-dimensional space.

Lest Mr. Bloodstein think me a carping critic let me hasten to assure him that this letter has been written only because his paper interested me deeply. I wholeheartedly agree with his final suggestions as to the necessary orientation for enjoying new art forms. As he so aptly says, 'we must learn to respond non-verbally to the canvas itself, the pigment itself, the form itself.' Surely he is entirely right when he tells his readers that 'before an oil painting can "look like an oil painting" to most people, and not like a "chair," "woman," "mountain," etc., there must be a complete re-education of their semantic reactions.'

KATHARINE KUH
Art Institute of Chicago

Art in Australia

SIR: An interesting observation which might serve as an addendum to Bloodstein's article on 'General Semantics and

Modern Art' is to be found in Margaret L. Macpherson's *I Heard the Anzacs Singing* (Creative Age Press, N. Y., 1942, p. 66):

> Most Australian art is derivative and naturalistic. I think that the national painting might be better if the national criticism and comprehension were better. The 'modern,' the cubist, the [post-(?)] impressionist, the abstractionist, are not understood, even by the pundits. The leading art critic is Sydney Ure Smith. One of his creeds is that 'it [modernist art] is only second-rate work which looks like paint and not like the subject.' Here is a man in a position to lead a whole nation wrong, and, in my opinion, he *is* leading them wrong. If you want pictures that are 'like the subject,' the camera is your medium, not paint. I would like to carve these words, large, on the door of every art gallery: *'Paintings are* THINGS, *not copies of things. Sculptures are* THINGS, *not copies of things.'*

P. D. HAAK

Dodd, Indiana

More on Bloodstein and Art

SIR: . . . I am surprised that Bloodstein finds 'modern' artists so assiduously concerned with 'consciousness of abstracting.' It has been my experience that most modern artists, consciously and otherwise, are determined to rationalize away the necessity for being conscious of their abstracting activities. One of the many methods by which this is achieved is illustrated in Bloodstein's own example. He says that on showing 'Three Musicians' by Picasso to an acquaintance, the latter said, 'I can't understand it. Will you "explain" it to me?' Bloodstein then analyzes this situation by referring to what is otherwise good general semantics theory about the terms 'understand' and 'explain.' We are informed that his acquaintance was responding on the verbal level, rather than on the unspeakable level. This is good 'theory' too. However, I think in this particular case it serves the purposes of rationalization.

For years the 'moderns' have had an extremely difficult time explaining just what they were up to. . . . One day, not so many years ago, Hans Arp, an artist, hit upon a clever set of verbalisms in the effort to alleviate this situation. He said, 'All a picture asks is to be looked at.' Thus he unconsciously strove to circumvent the necessity for the artist's revealing the poverty of his consciousness of the abstracting process in art. You see, if all one has to do is 'look,' then the artist no longer needs to explain, when asked by the layman, exactly what he, the artist, sees when he looks.

While it is true that art is not words, it is also true that neither is anything else that we use words for, except when we are talking about words. If the investigator is not careful he can use an otherwise valid theory to rationalize away the necessity of admitting his own ignorance. . . . At least he should admit his ignorance, and not shield it by suddenly discovering that art becomes unspeakable at a most crucial point in a discussion of it. . . .

Bloodstein further contends that identification was the major function of 'traditional' art. But this is far from stating the case in its more interesting and complete form. Just as we cannot strive for a non-aristotelian system in general without first having an aristotelian system, so we cannot have the same turn of events in art. The aristotelian period is far from being a mere case of identifications, of complete negation; rather the one came

first, making possible what followed. It is this problem which the 'moderns' cannot understand and resolve, so rather than admit that there is such a problem they prefer to sweep it out of existence as 'an isolated offshoot from the main stem of world art,' to quote Bloodstein.

Result: we are presented with an either-or situation; all 'bad' art is 'realistic,' all 'good' art is not. So long as the history of art is viewed simply in terms of one extreme and the other, so long will the traditionalists and the moderns forever argue, each getting nowhere in the attempt to convince the other of his point of view. We will continue, as Bloodstein does, to cut history into three pieces, with traditional art in the center as the grand mistake, flanked on each side by glorious achievements. This is a theory of history which has been very popular for over a quarter of a century among modern artists and their apologists, and which leads to many incongruous results. In the case of Bloodstein, it would appear that the moderns are non-aristotelians reacting against aristotelianism in order to continue the pre-aristotelian era of behavior in art. 'Obviously' something is in need of reconsideration here. . . .

I agree with Bloodstein that 'modern' art is producing a direction comparable to the non-aristotelian system as Korzybski shows it, and that this future direction for art demands that the artist discipline himself in consciousness of abstracting and all that implies. But this is not to be found operating in 'modern' art in general; it is only in *particular* modern schools. Much that is labelled 'radical' is not radical at all, but reaction claiming to be a new 'wave of the future.' . . . Then there are others who are striving for the new but are frustrated because their evaluations are cluttered with the old or a superficial comprehension of the new.

In short, Bloodstein hopes for a non-aristotelian future for art, but this cannot be achieved by indiscriminately expecting it from all kinds of diverse arts crudely lumped together under the ambiguous label of 'modern'. . . .

CHARLES BIEDERMAN
Red Wing, Minnesota

'God Did It'

SIR: . . . A friend of mine once captured a few termites and confined them in a box to show to his acquaintances. In the morning he picked the box up from his desk and on opening it was astonished to find the termites standing side by side with wings spread in perfect array like so many airplanes in a row. Closer scrutiny revealed that they had died. The fact of their death was easily understood, but how or why had they arranged themselves thus? If you say, 'God did it' you are perhaps stating the truth, but you haven't answered the question.

CHARLES H. OWEN
Osborn, Ohio

How to Encourage Editors

SIR: When I received the card [announcing *ETC.*] I was ill. I am still under the doctor's orders and will not be able to read for some time yet. Nevertheless, I want *ETC.* so that I will have it when I am allowed to read again. I enclose $3. . . . GEORGE E. LODGE
Chicago

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Compiled and edited by M. Kendig

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